

THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

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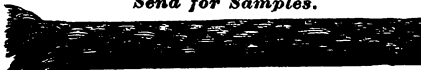
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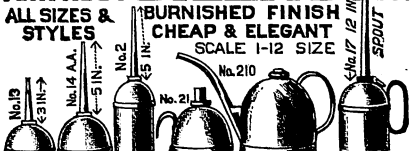


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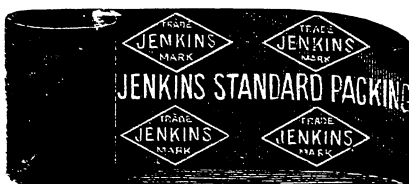
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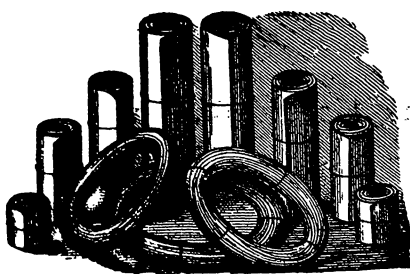
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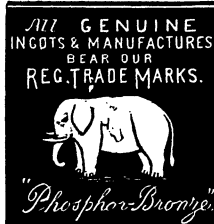
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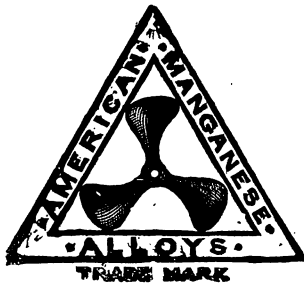
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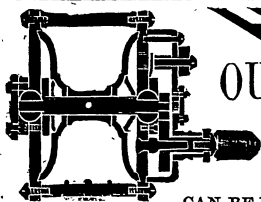
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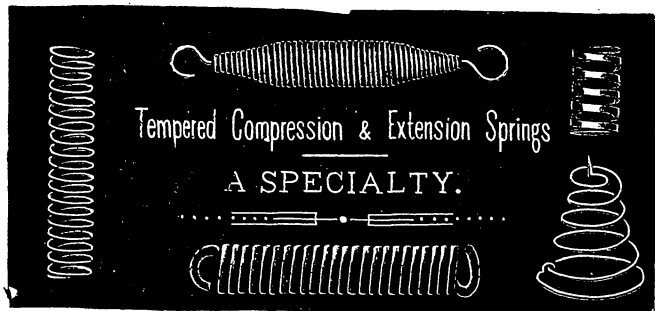
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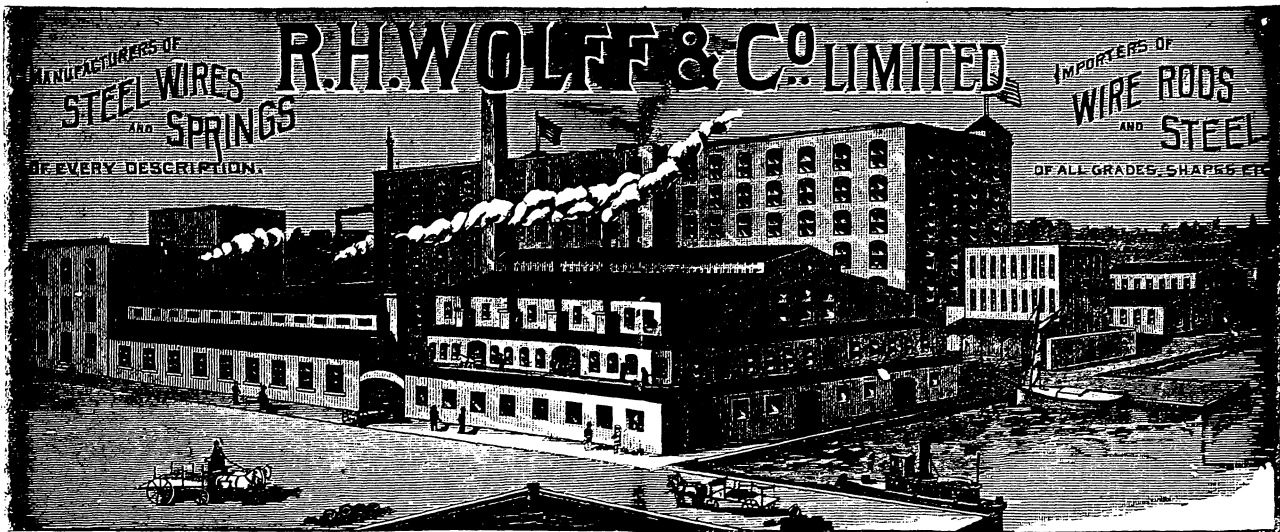
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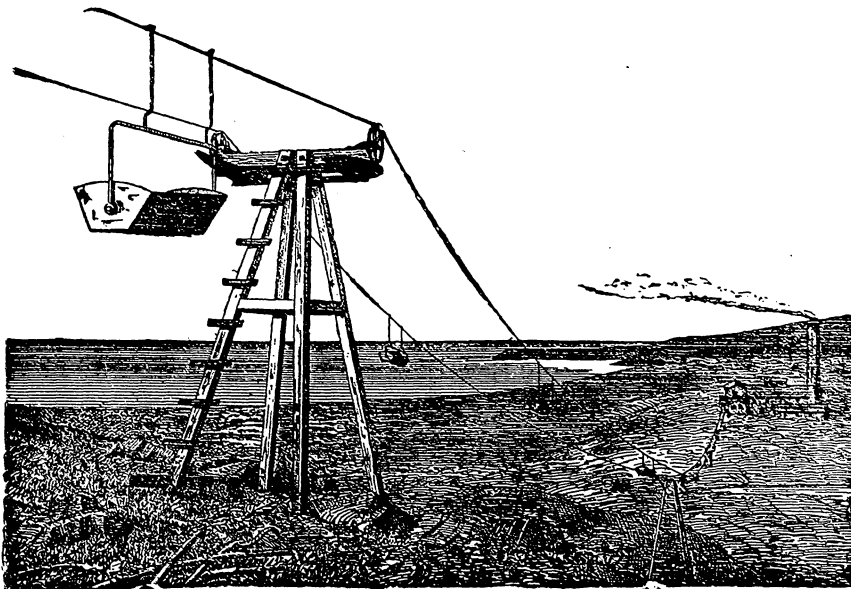
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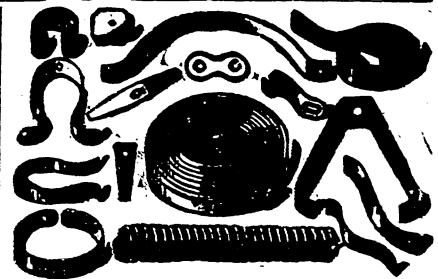
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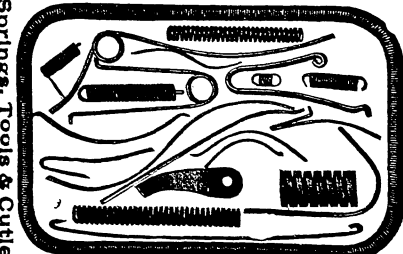
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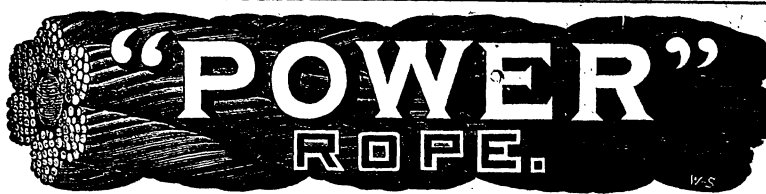


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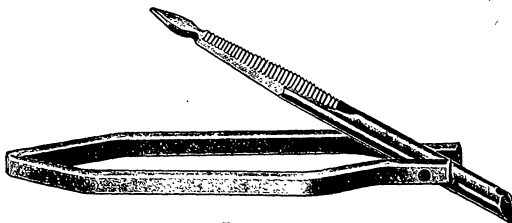


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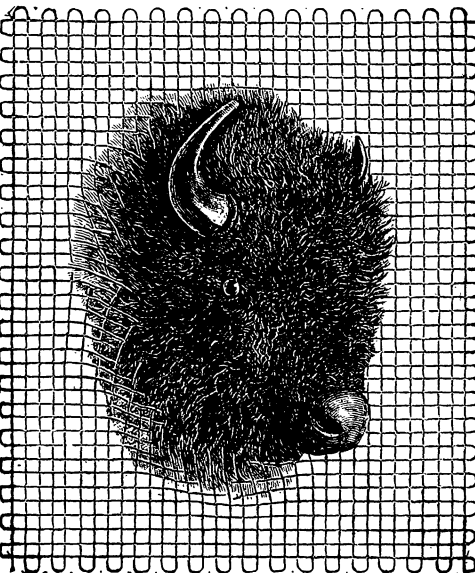
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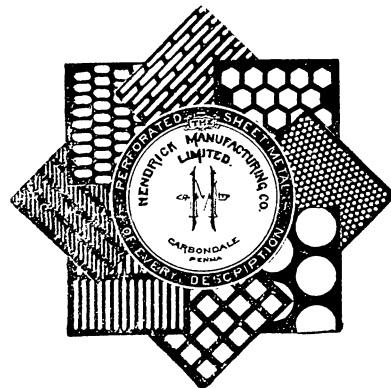
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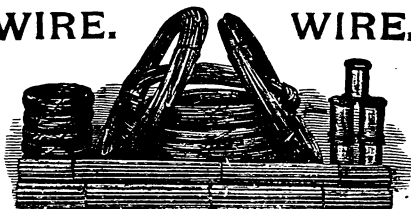


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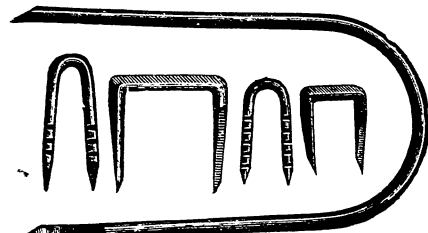
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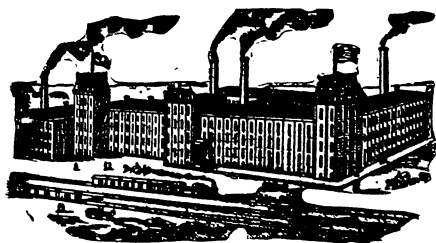
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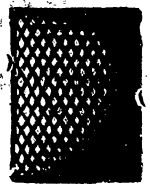


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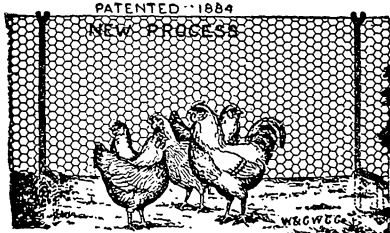
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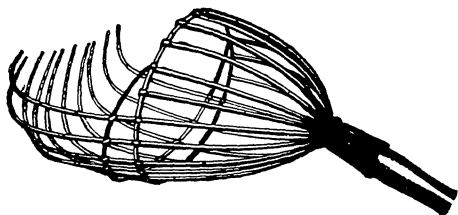
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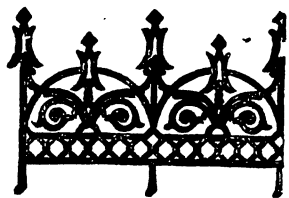
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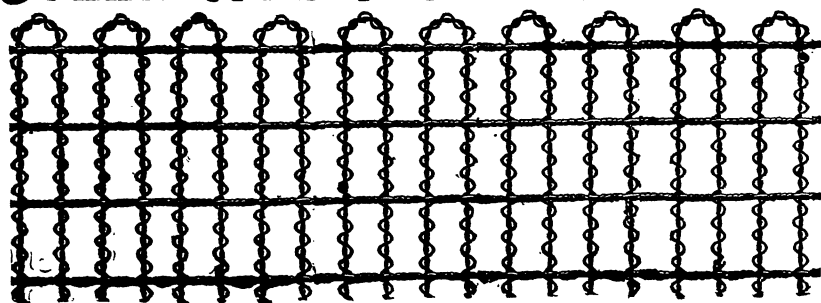
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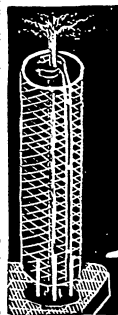
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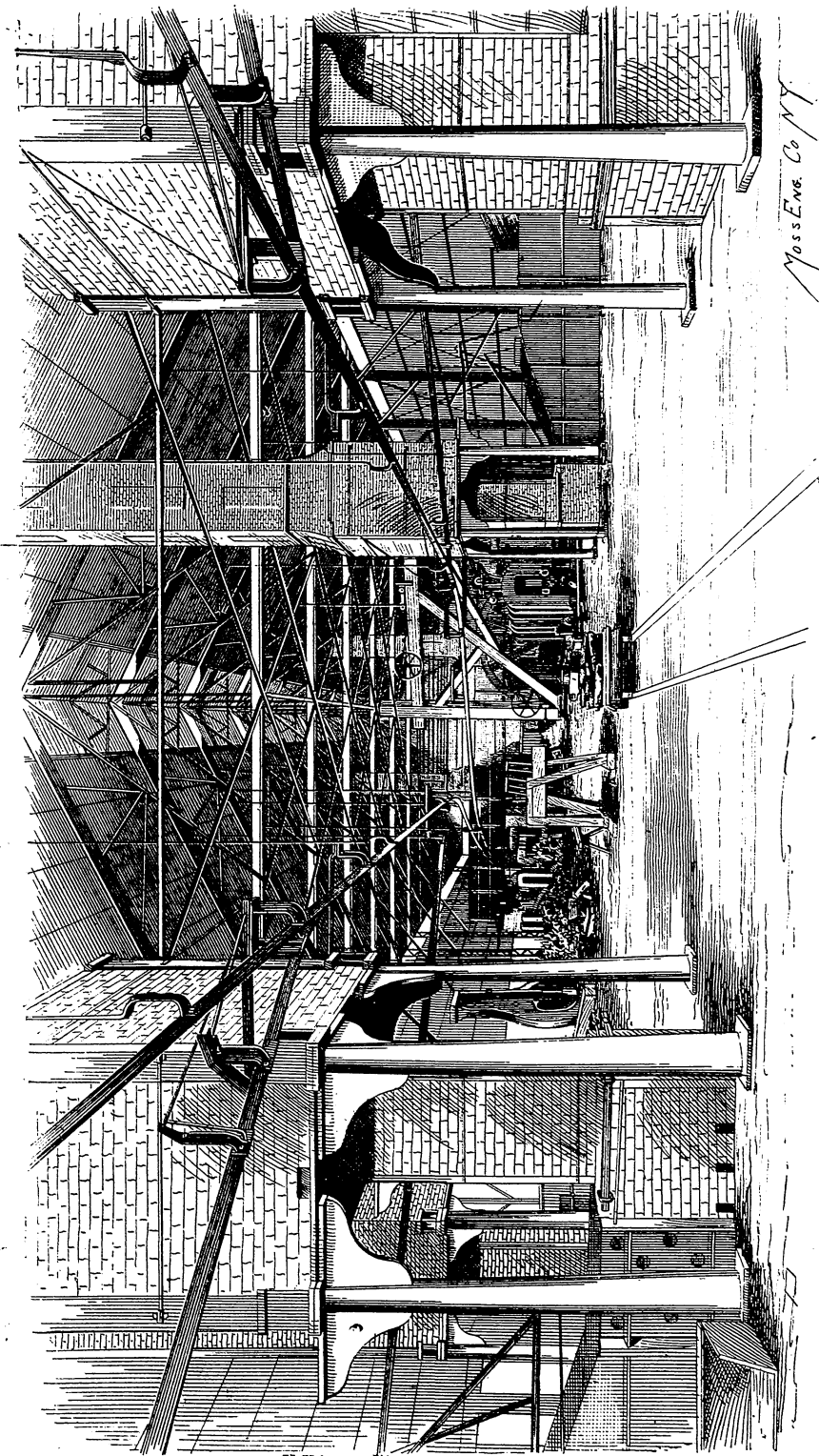
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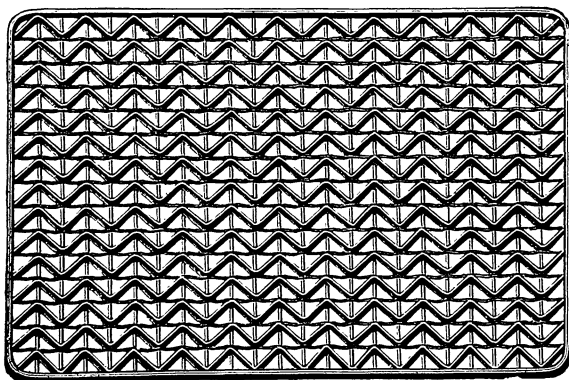
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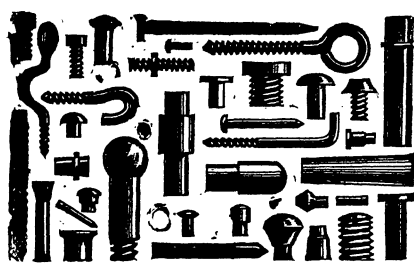
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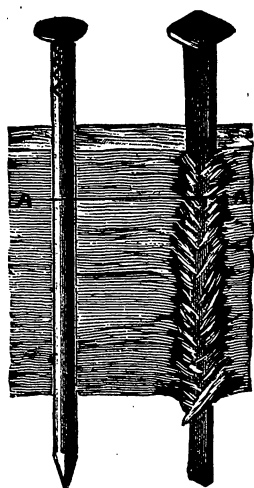
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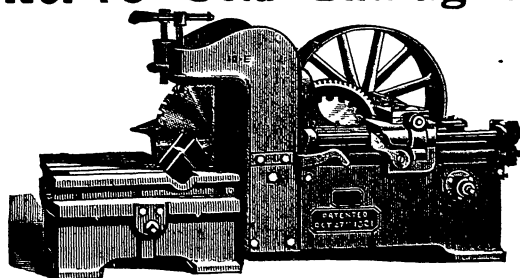
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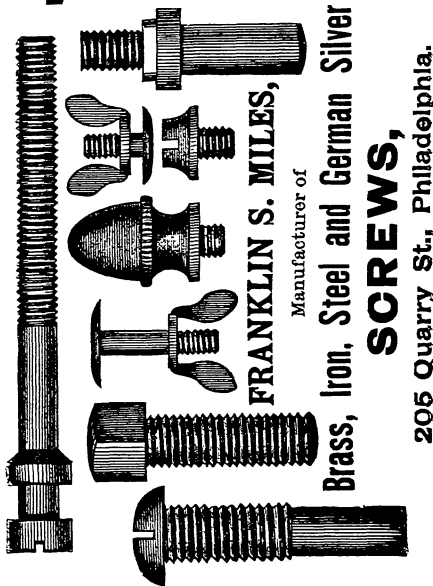
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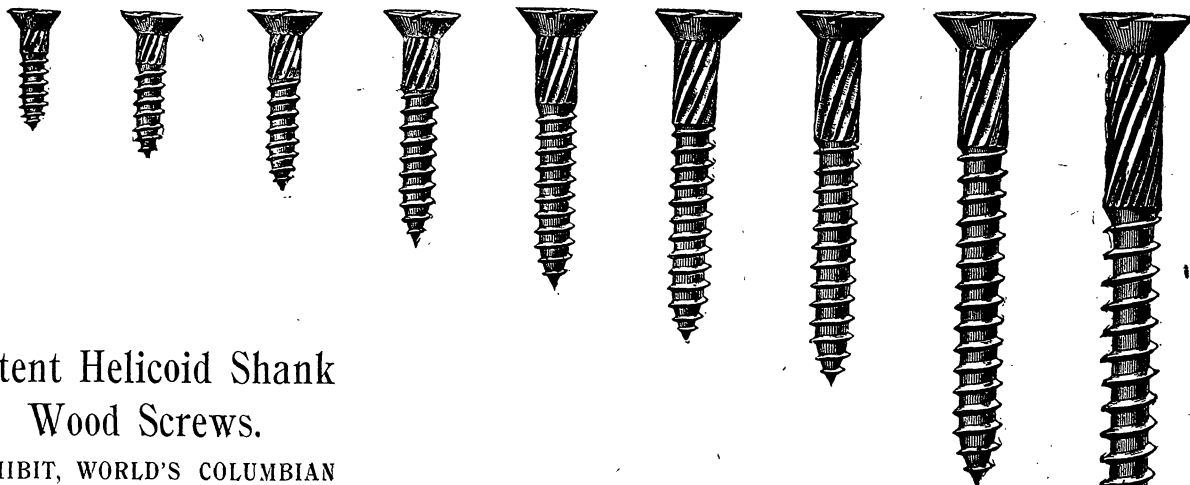
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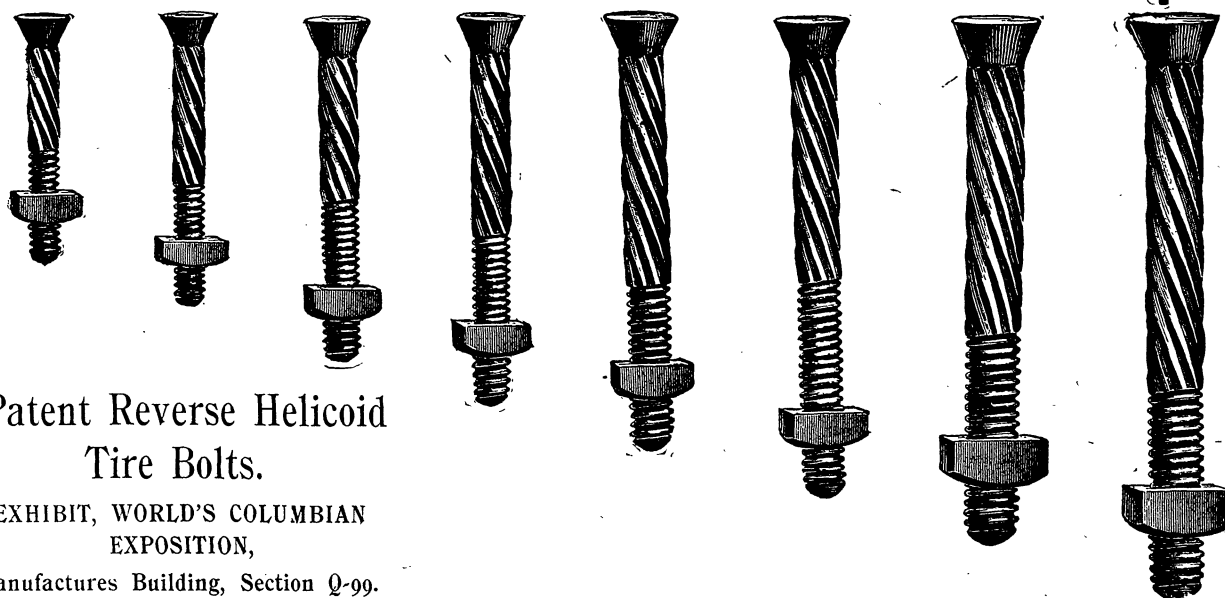
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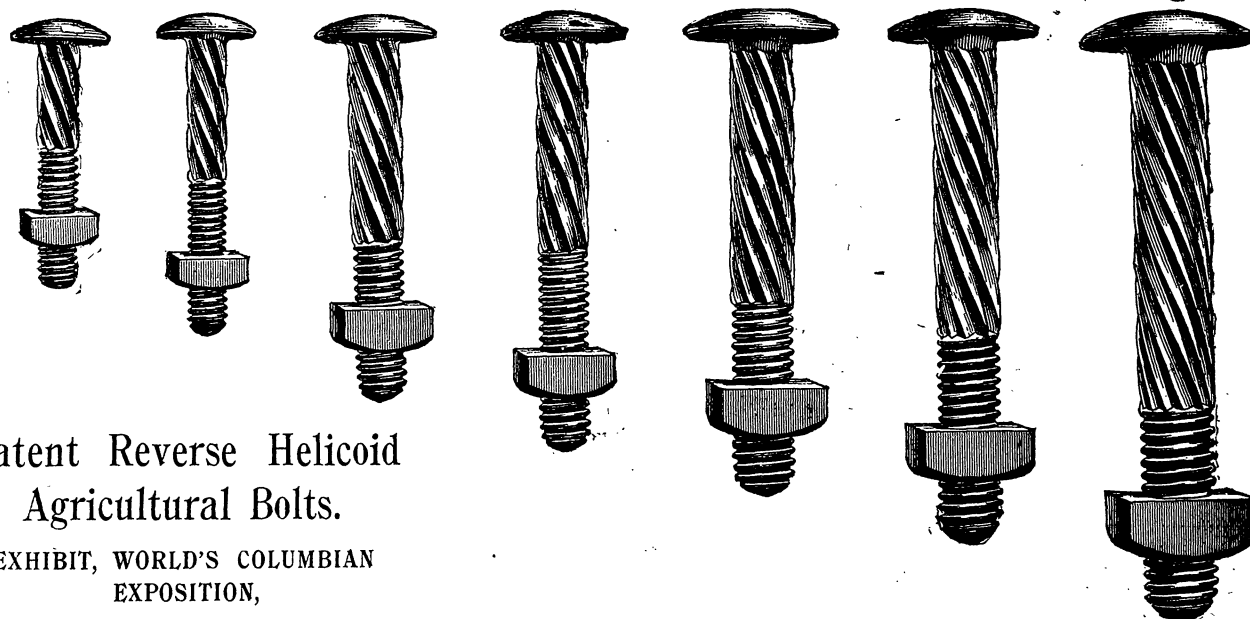
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Patent Reverse Helicoid
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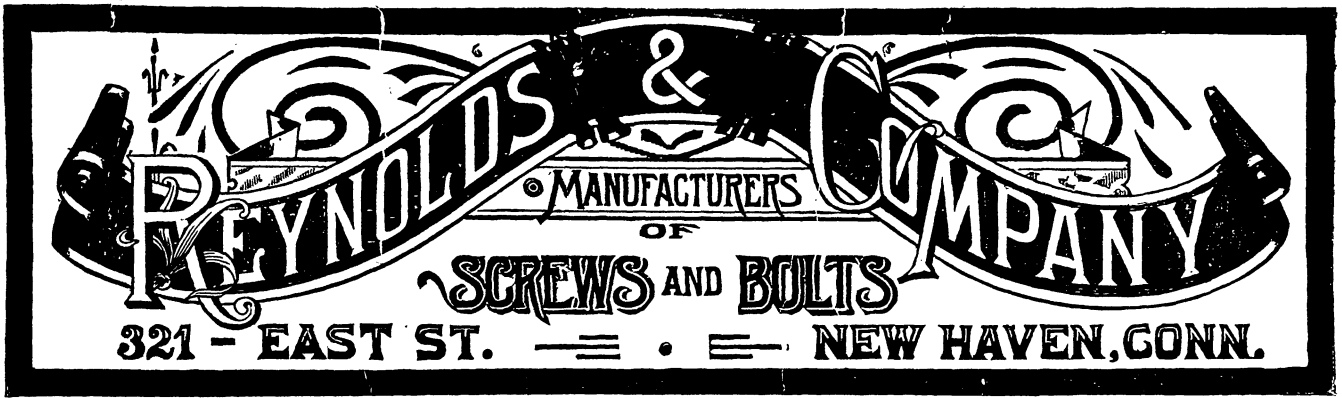
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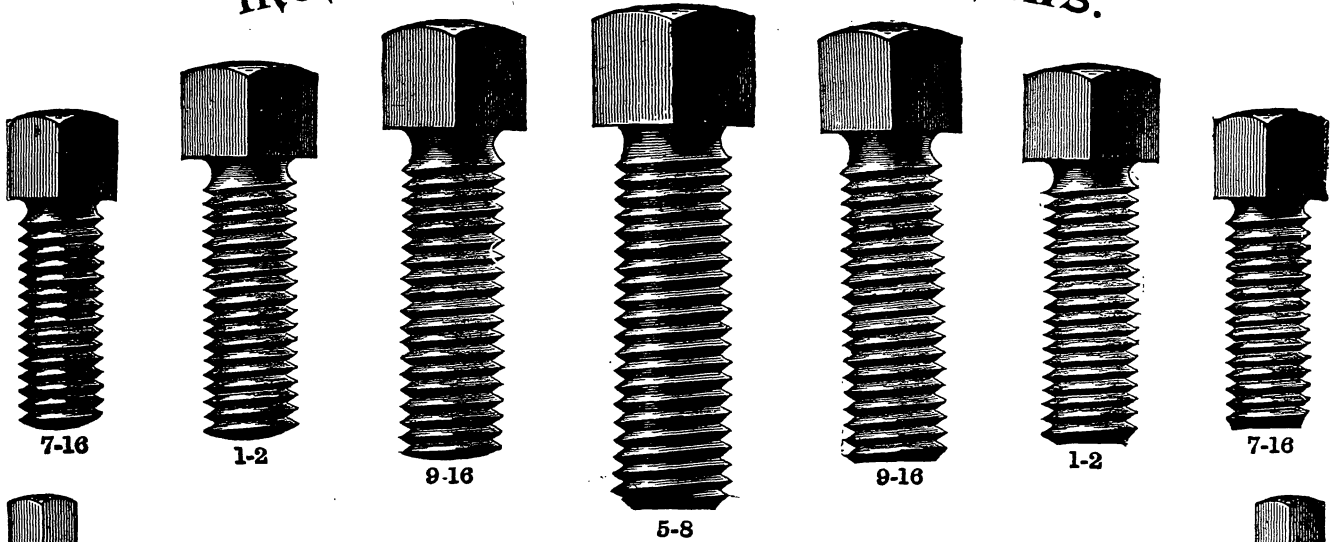
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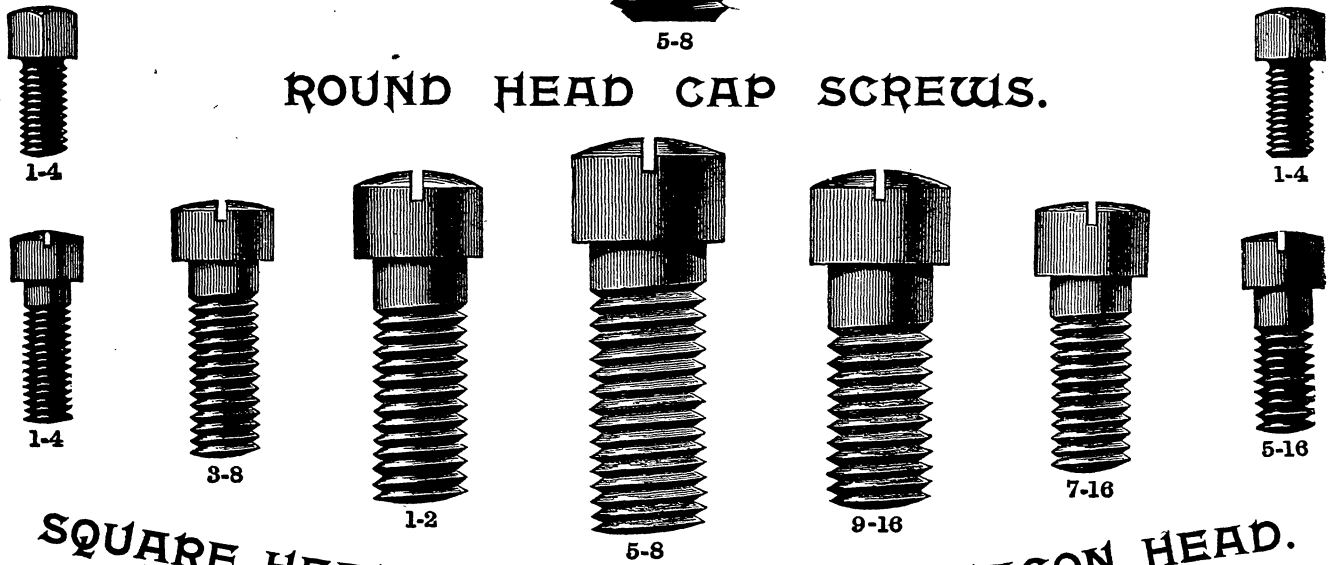
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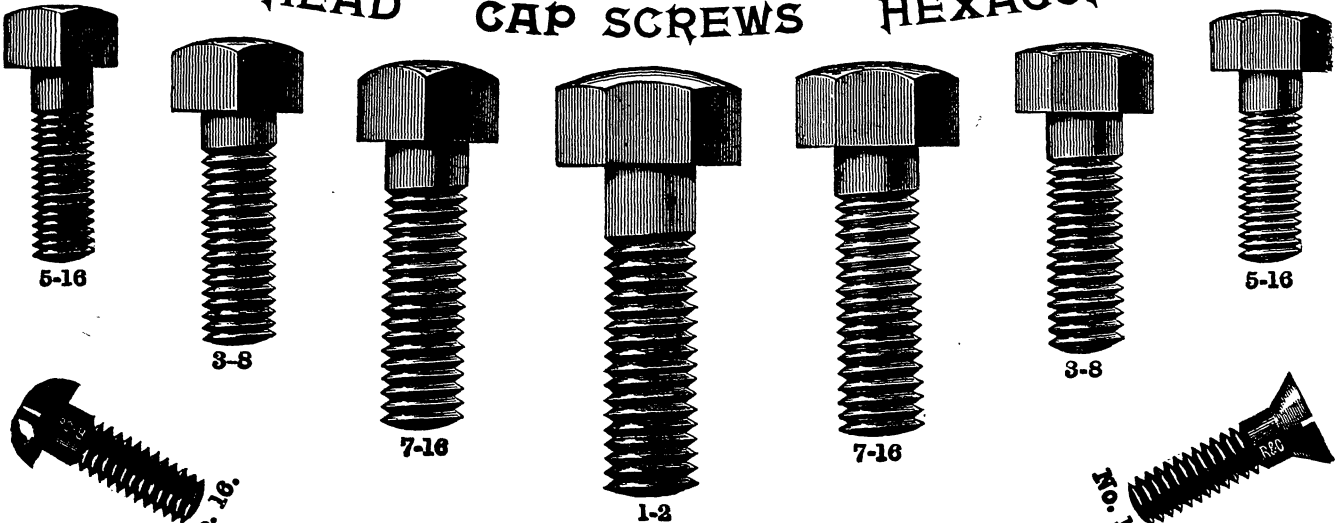
IRON AND STEEL SET SCREWS.



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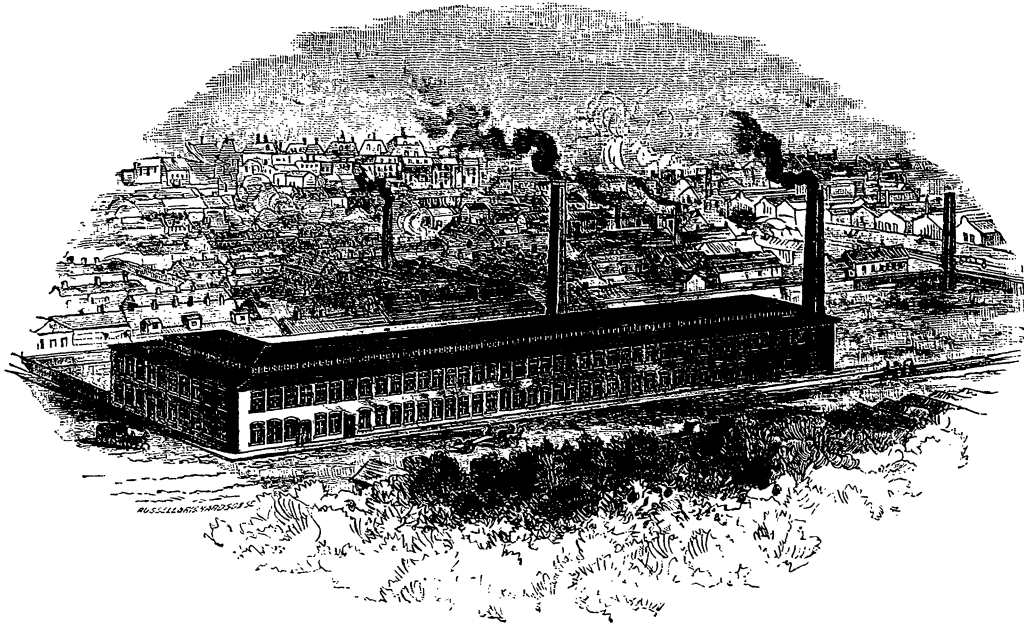
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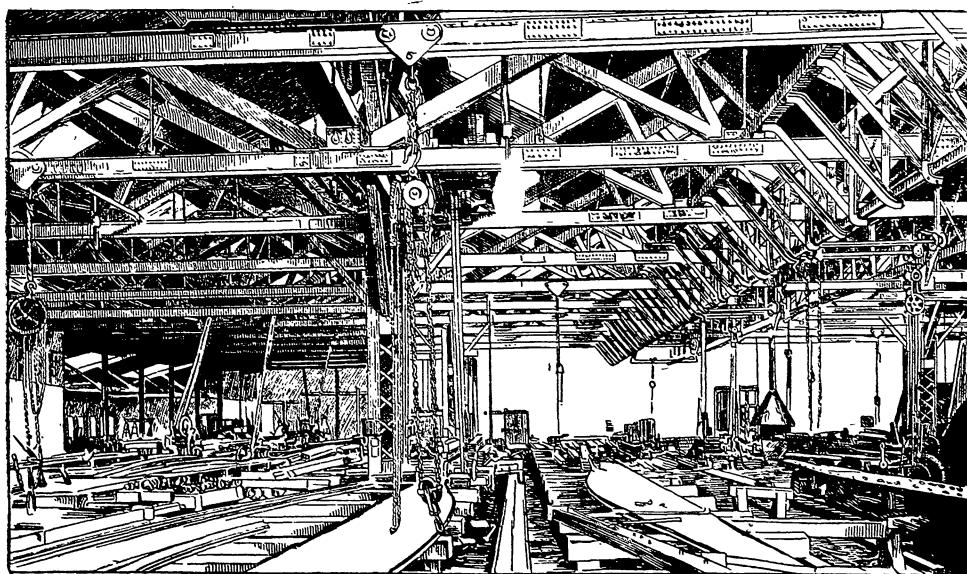
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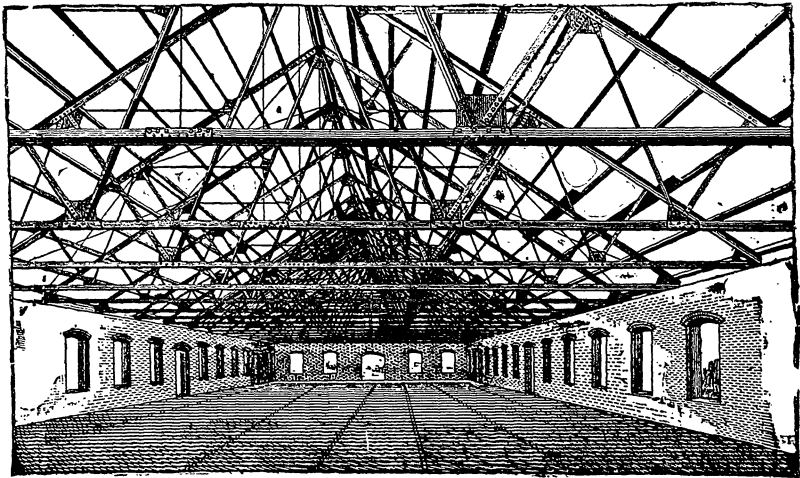
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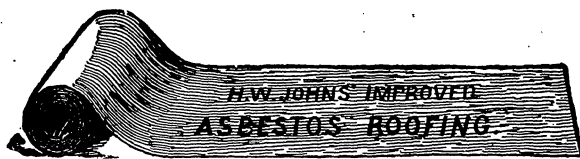


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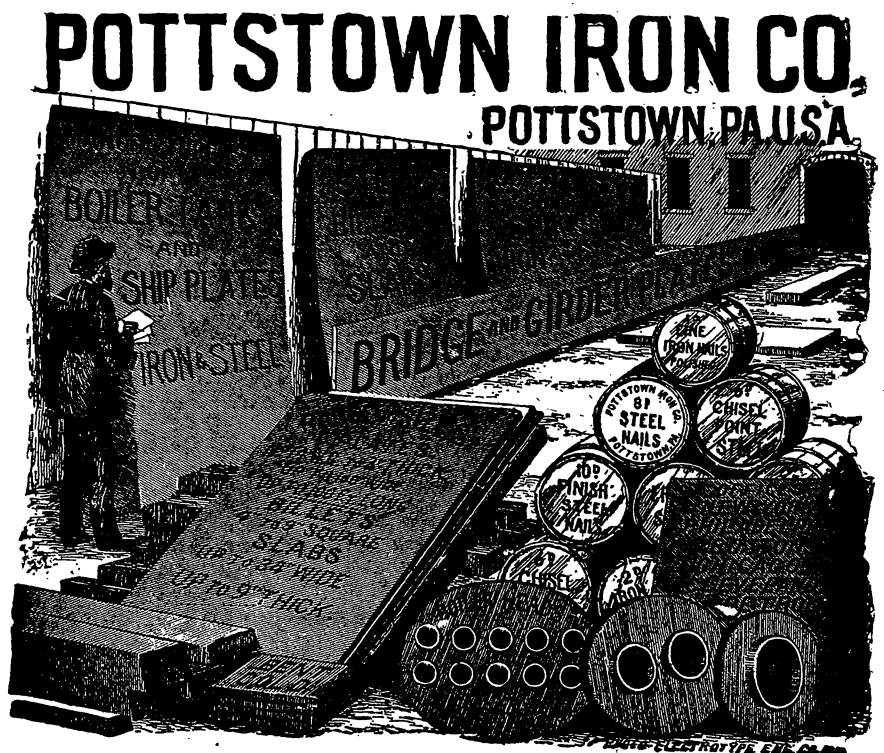
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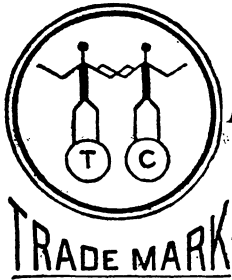
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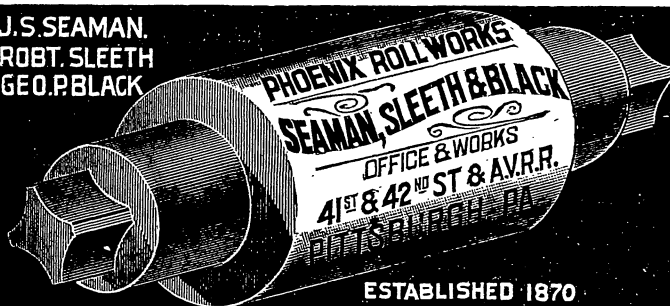
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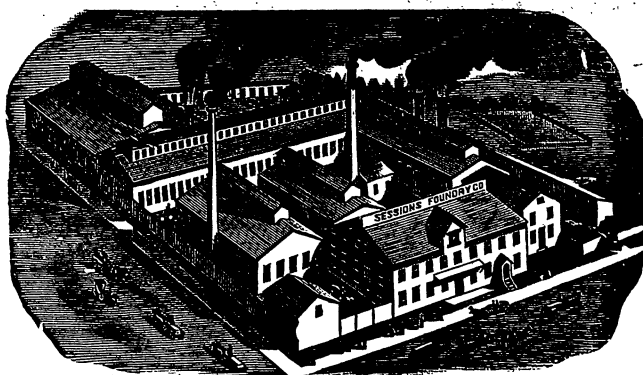
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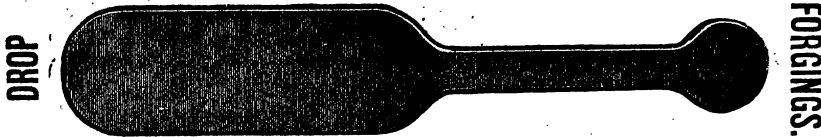
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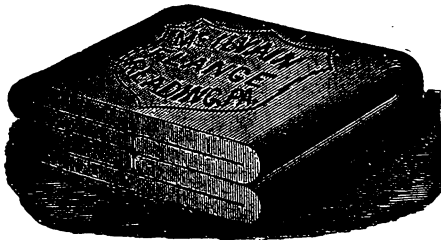
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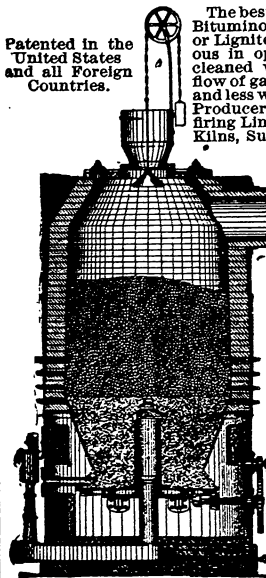
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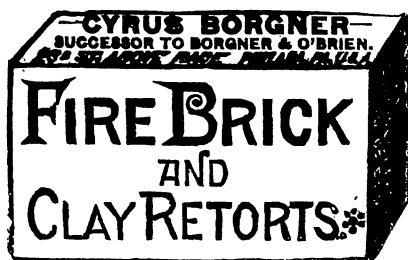
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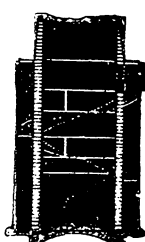
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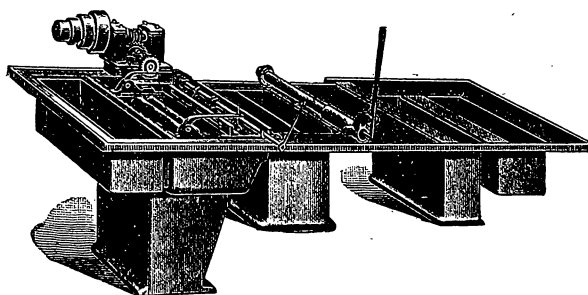
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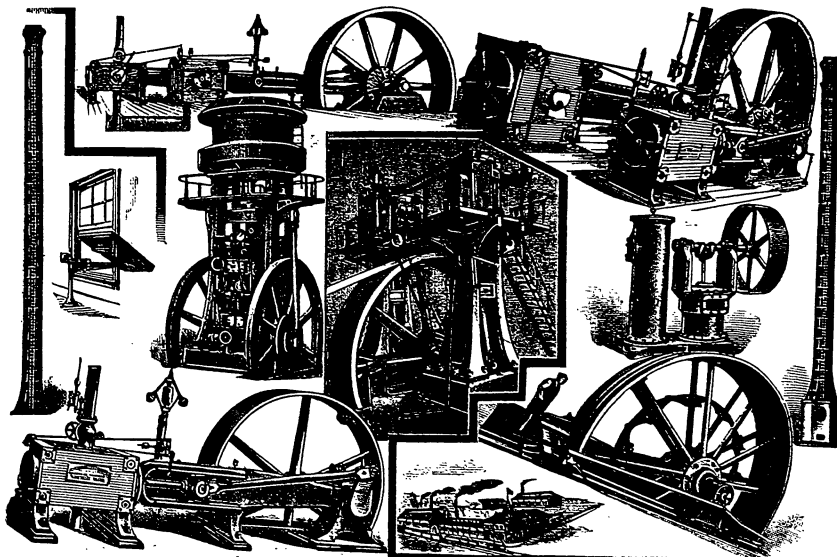
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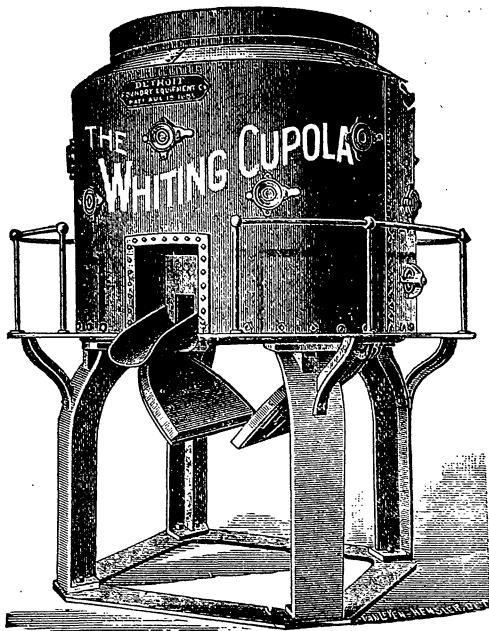
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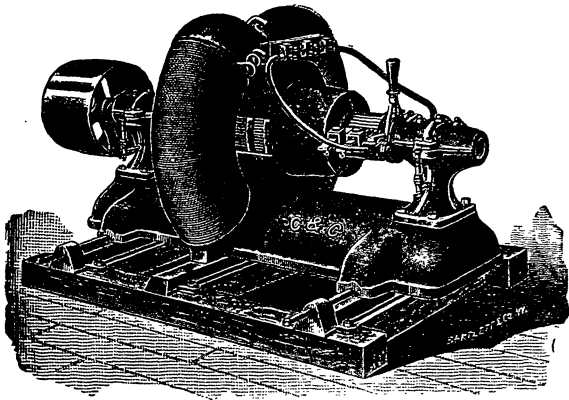
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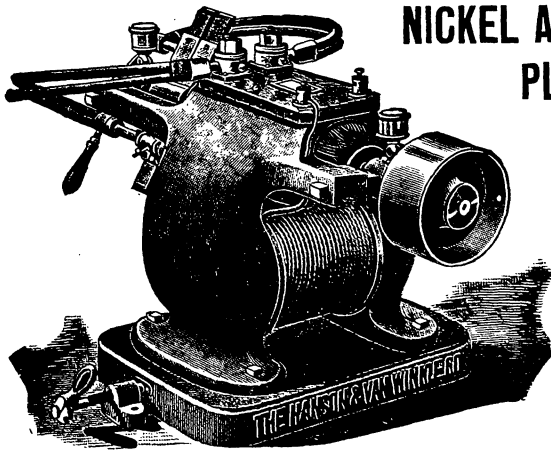
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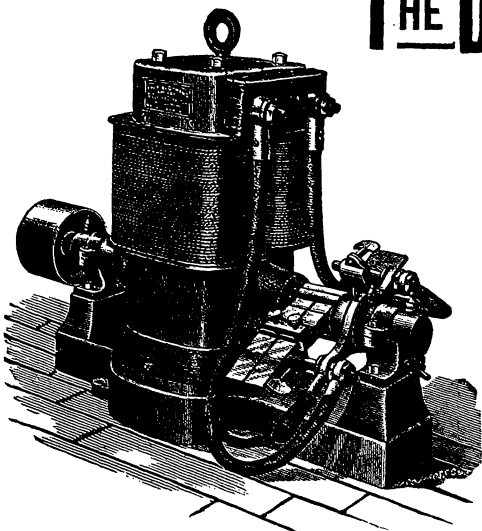
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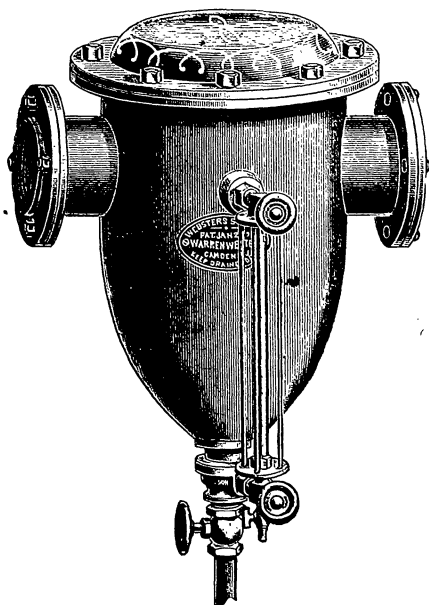
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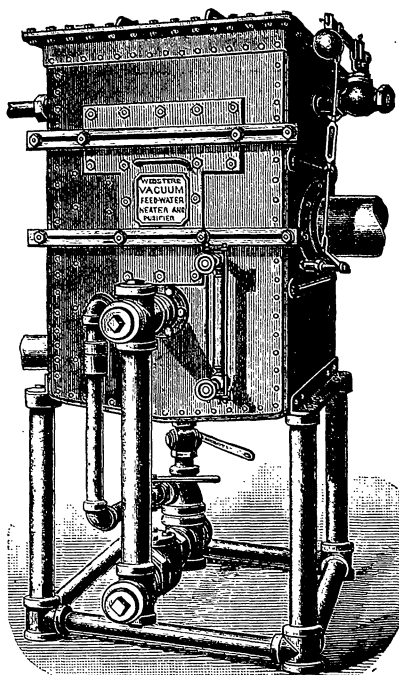
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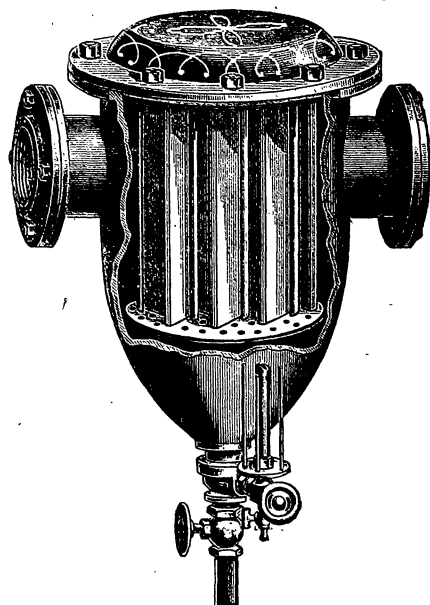
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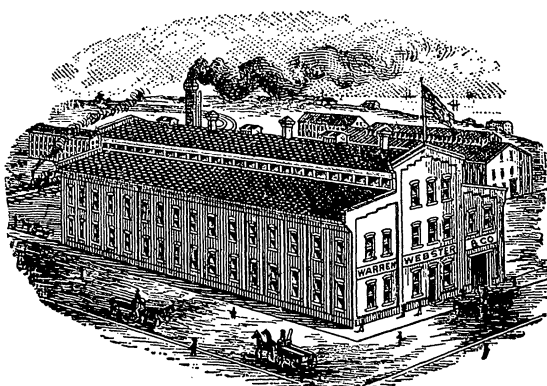
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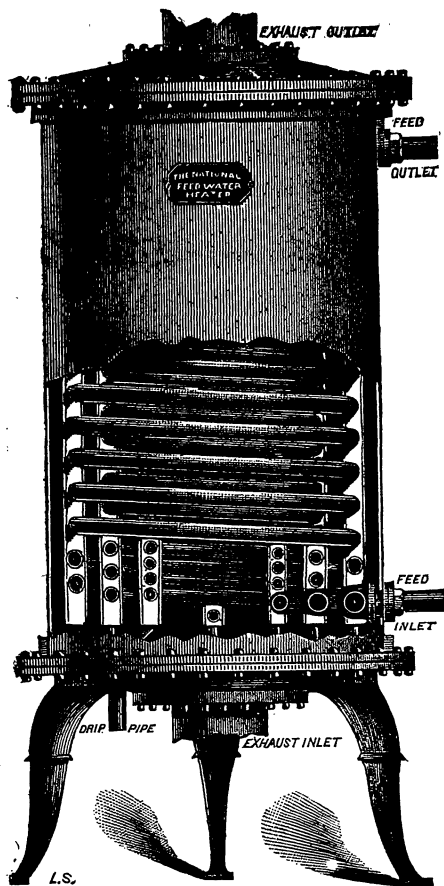


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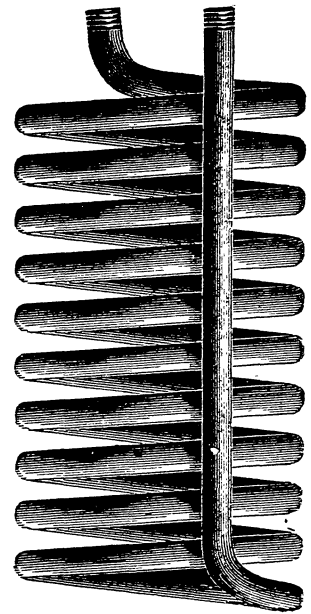
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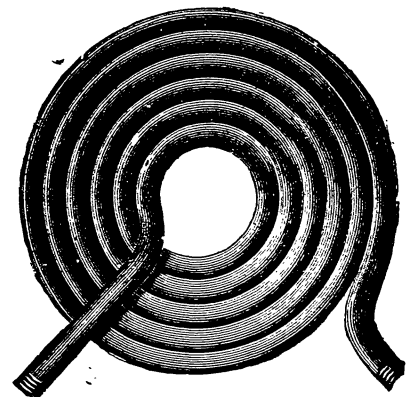
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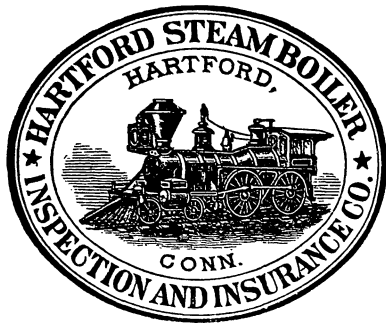
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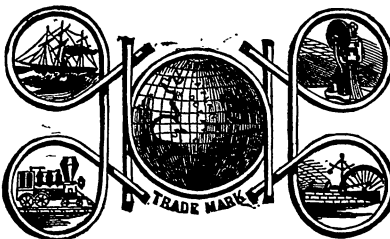
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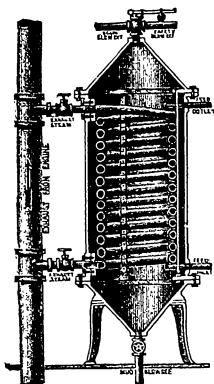


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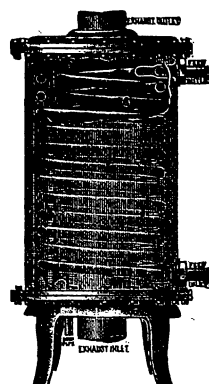
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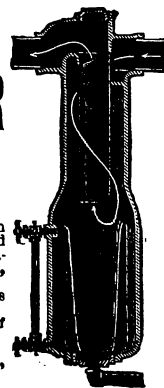
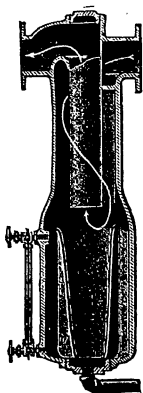
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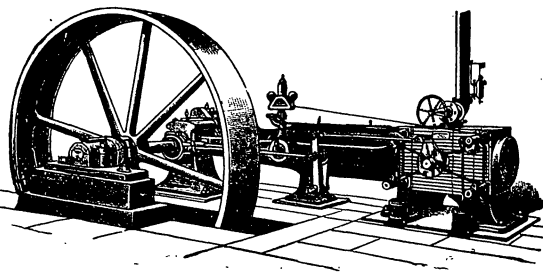
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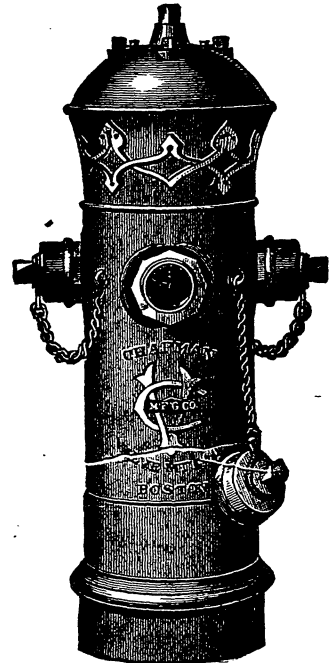
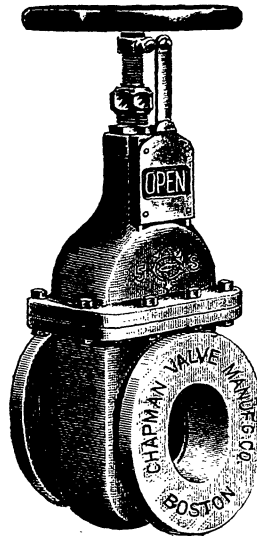
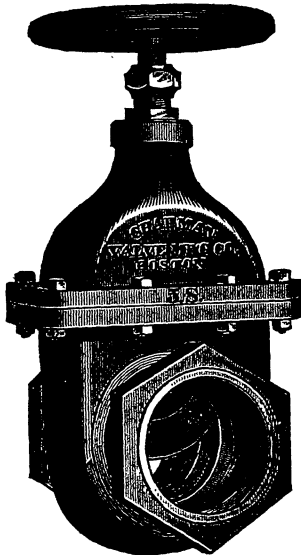
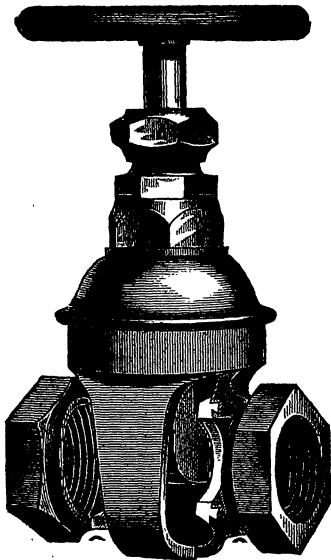
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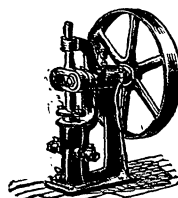
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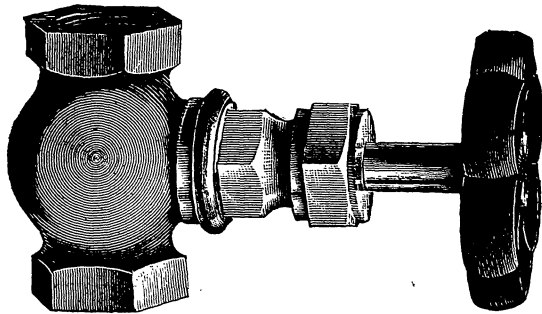
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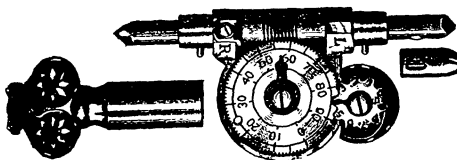
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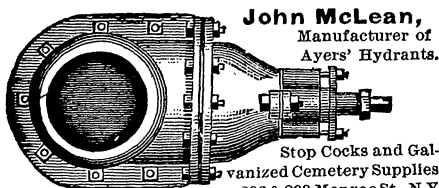
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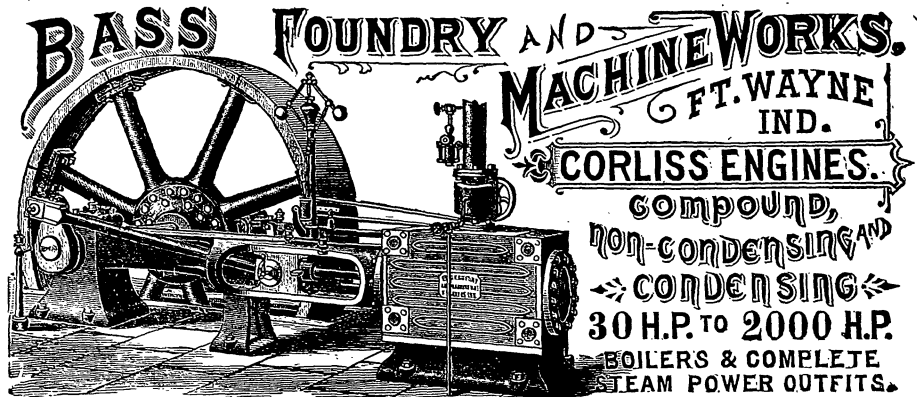


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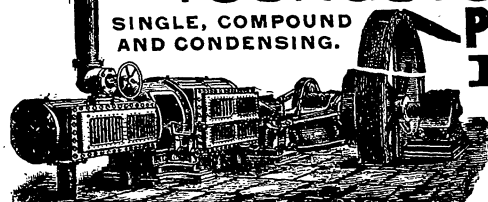
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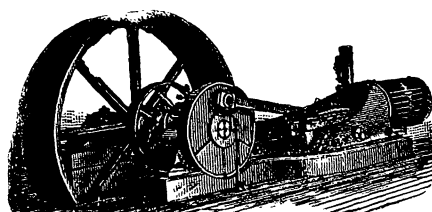
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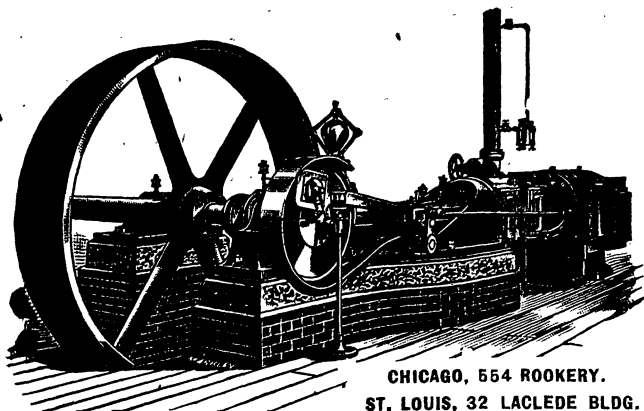
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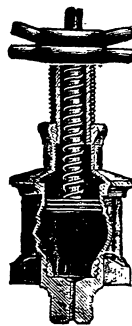
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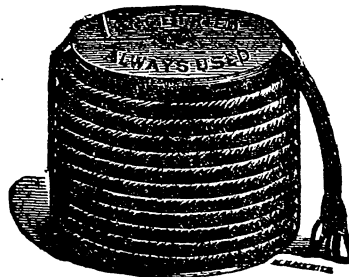
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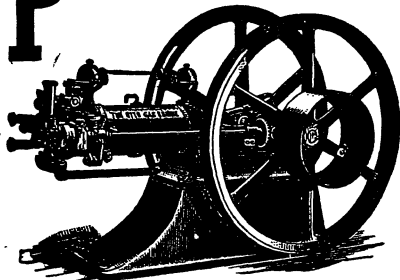
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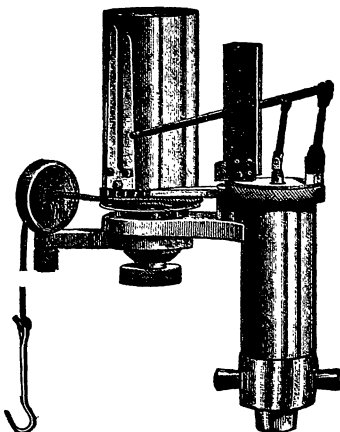
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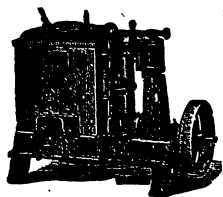
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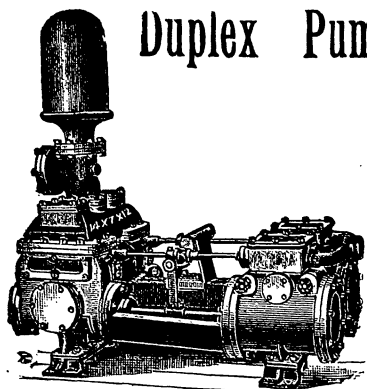
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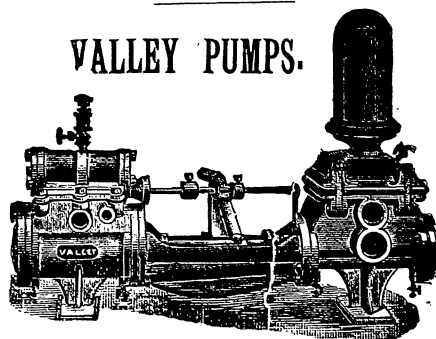
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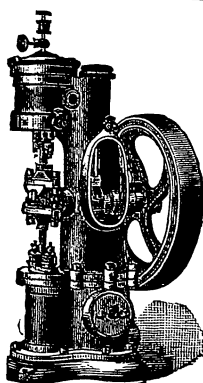




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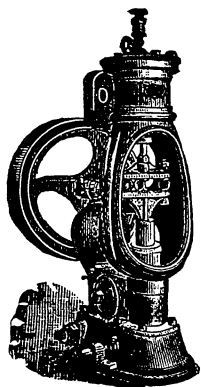
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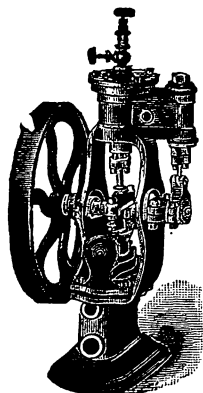
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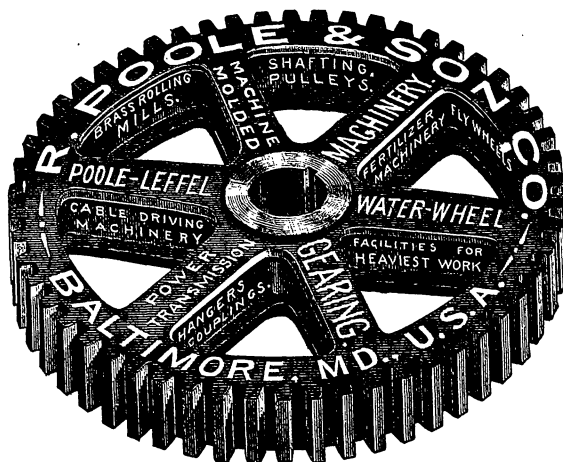
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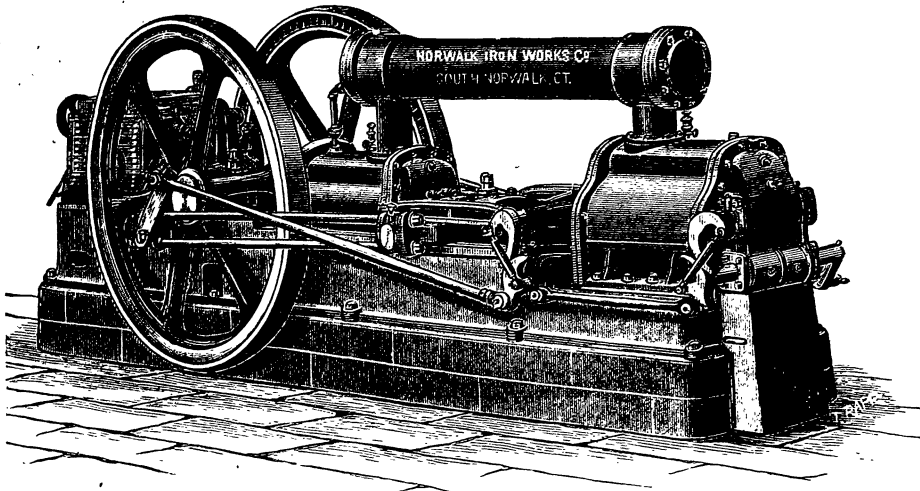
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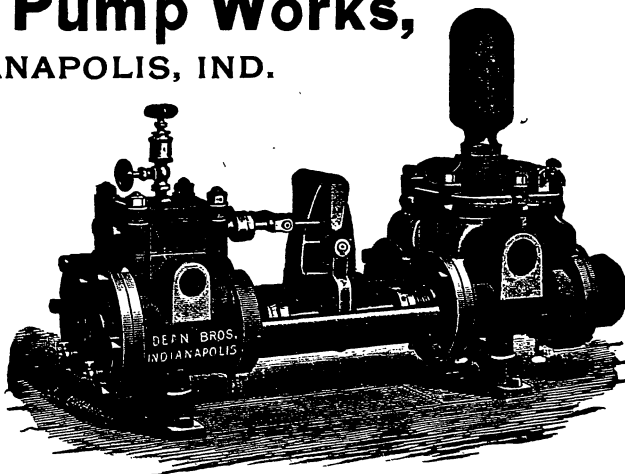
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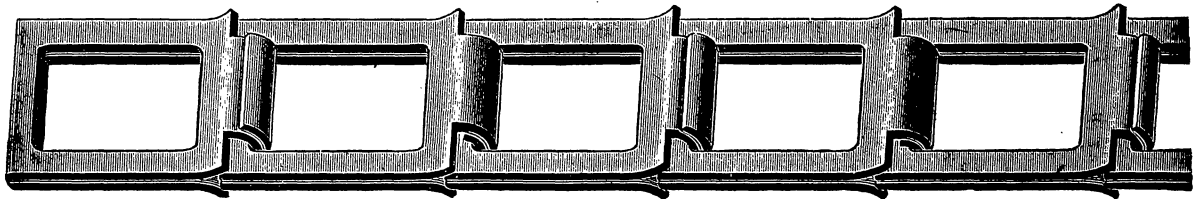
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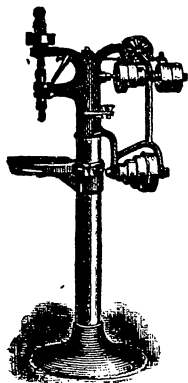
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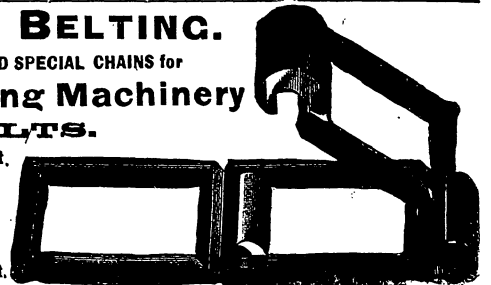
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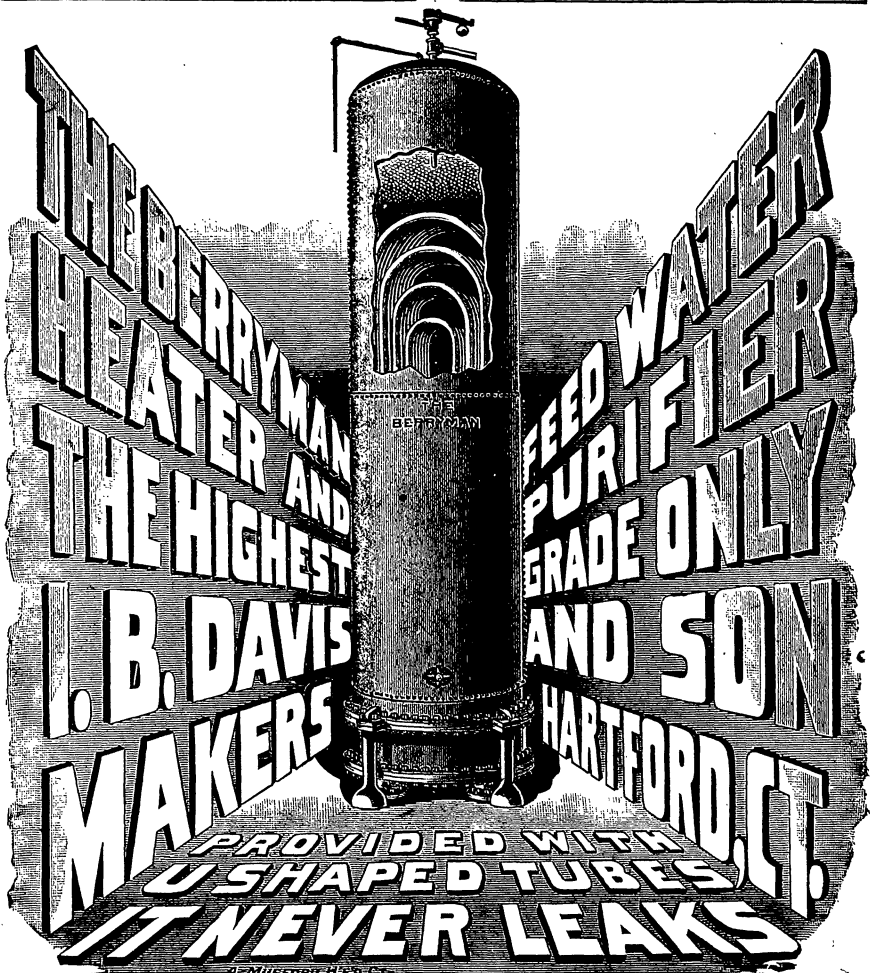
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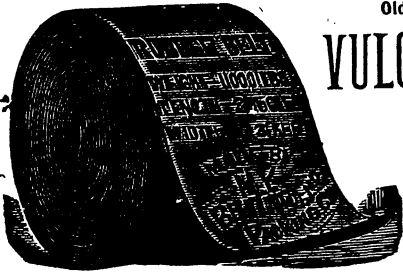
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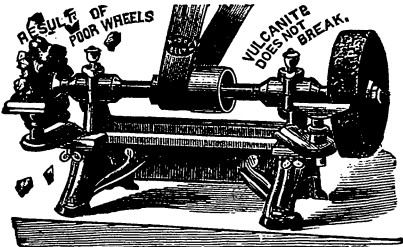
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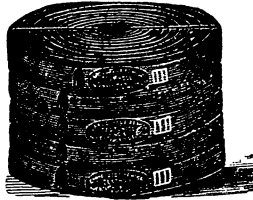
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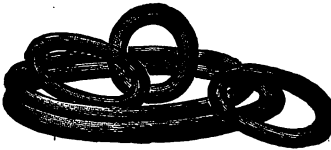
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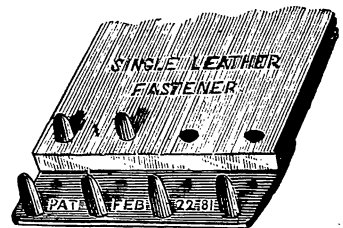


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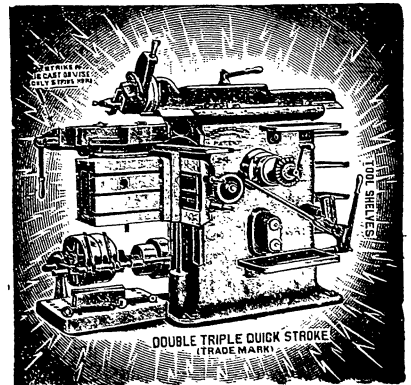
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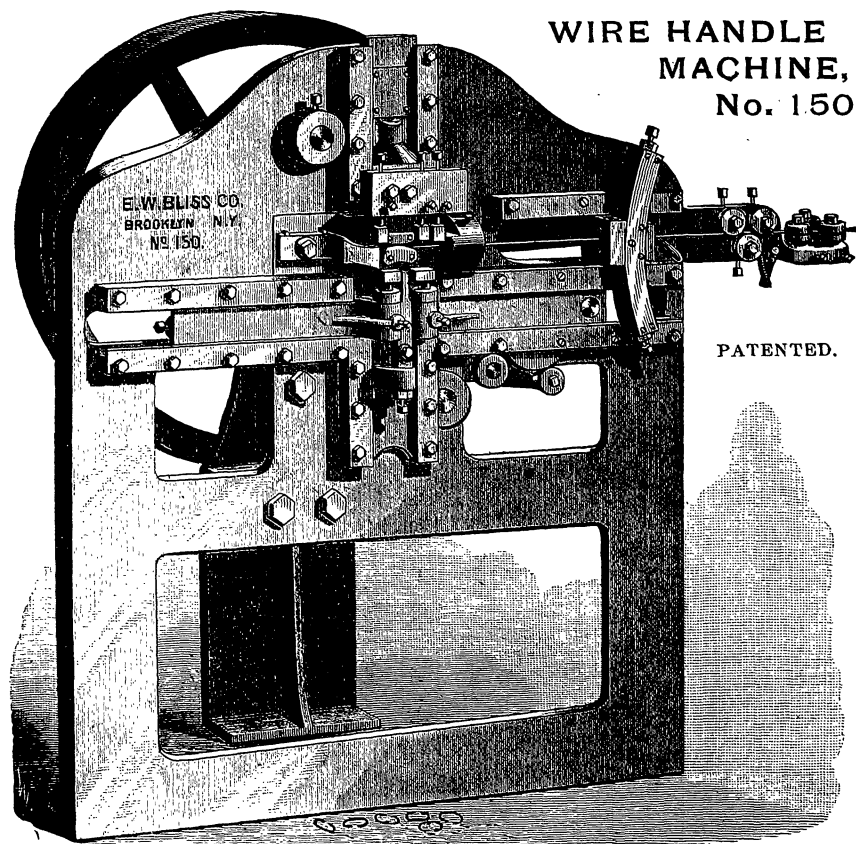
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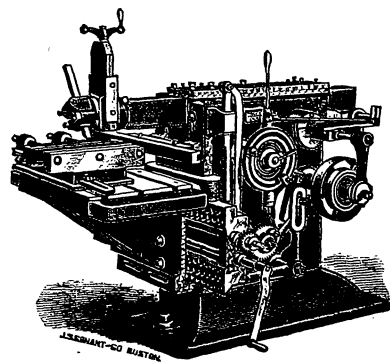
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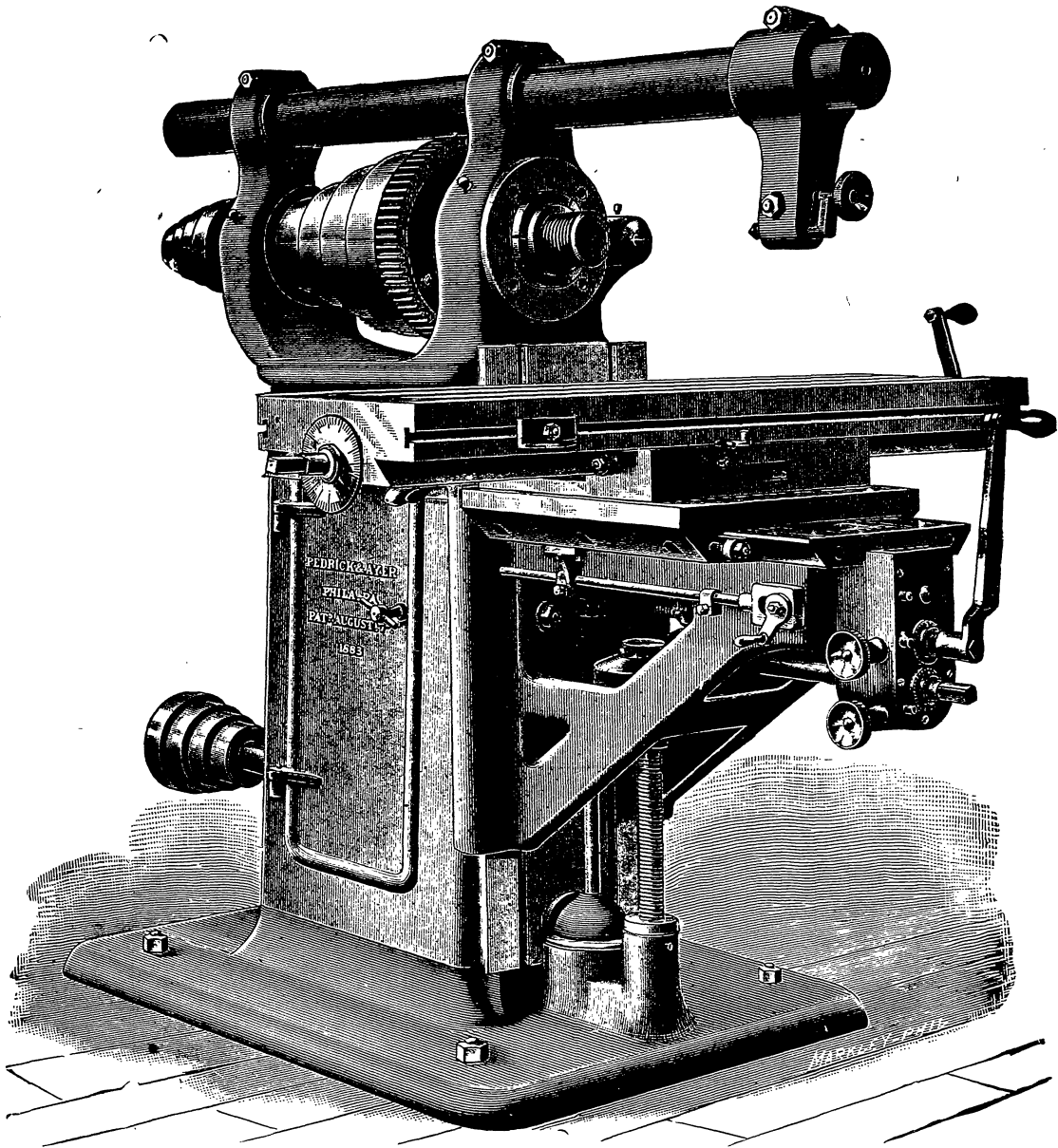
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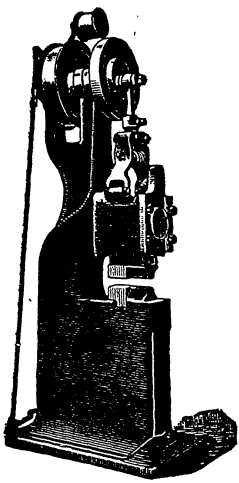
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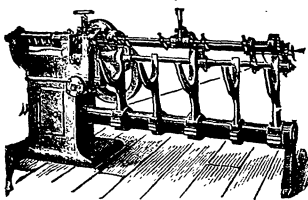
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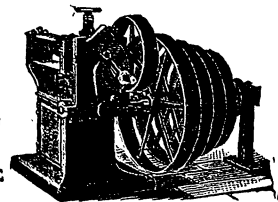
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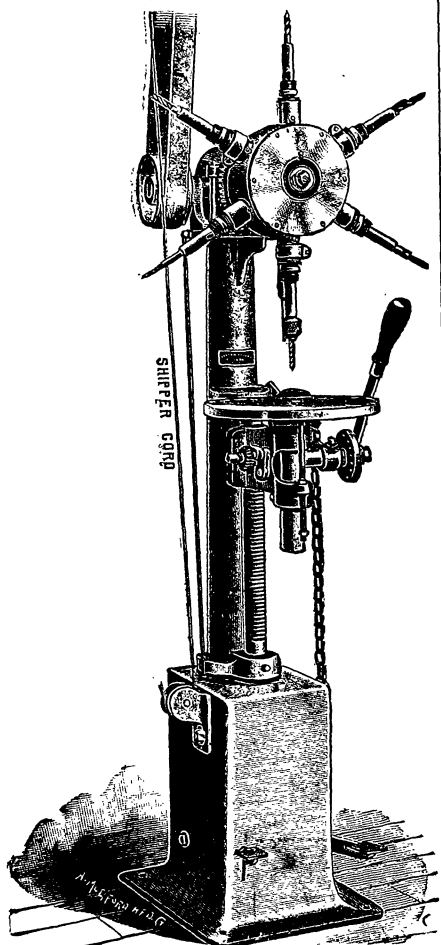
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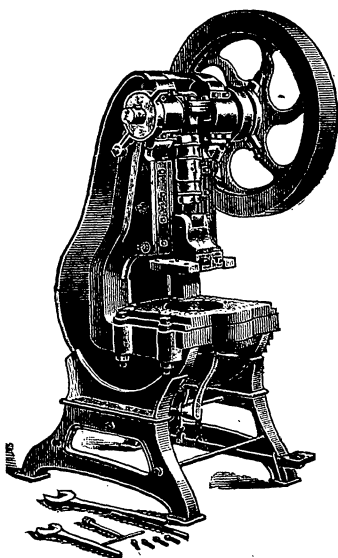
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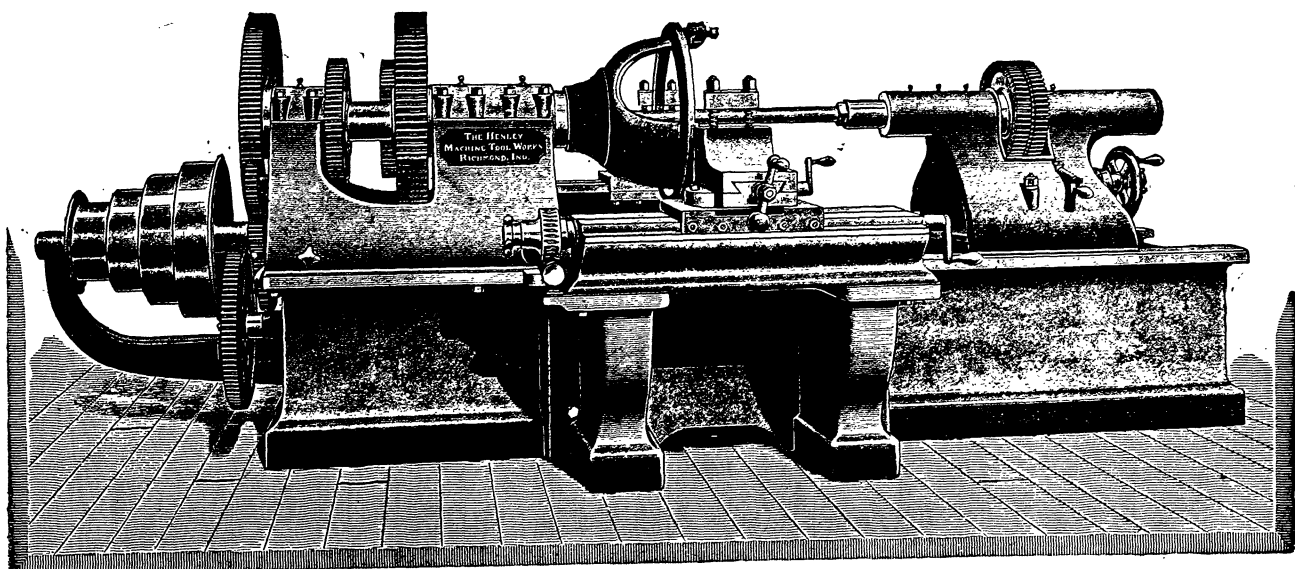
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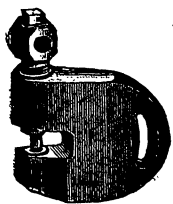
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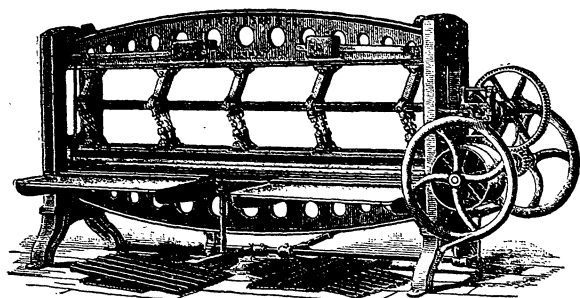
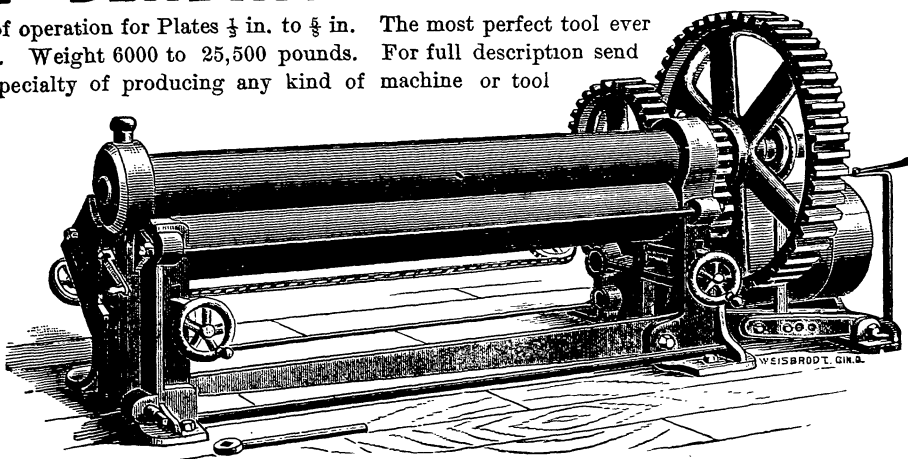
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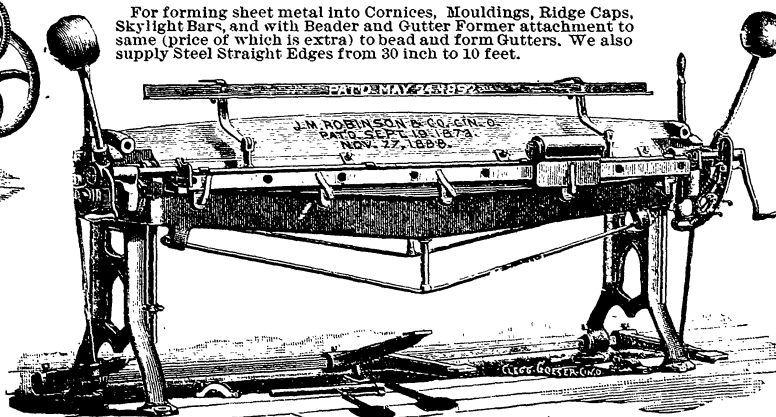
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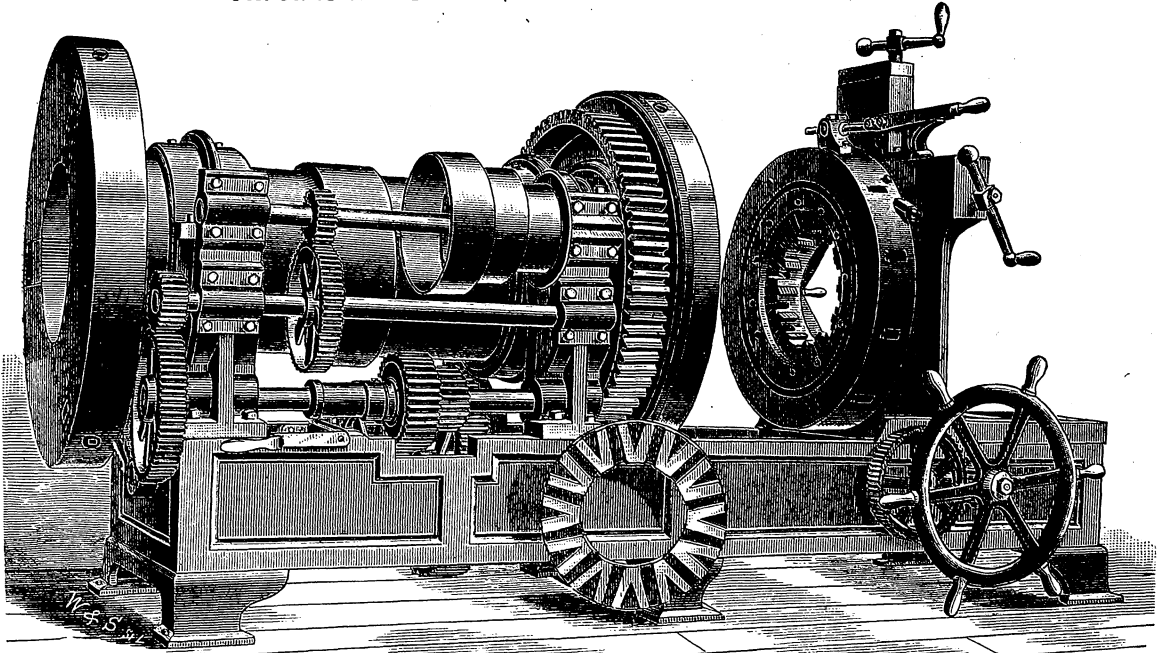
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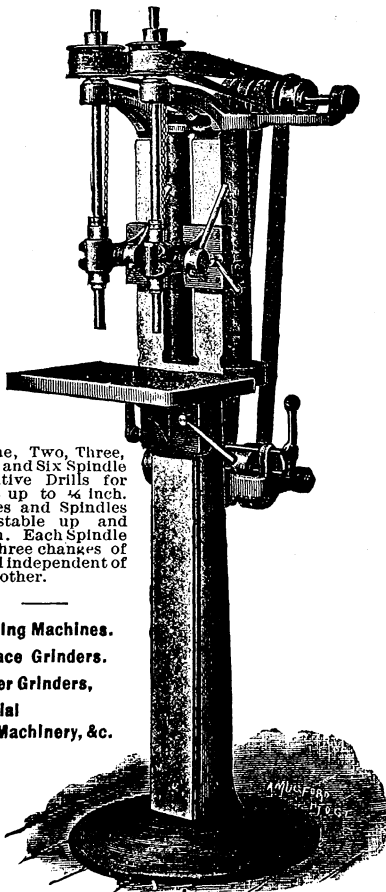
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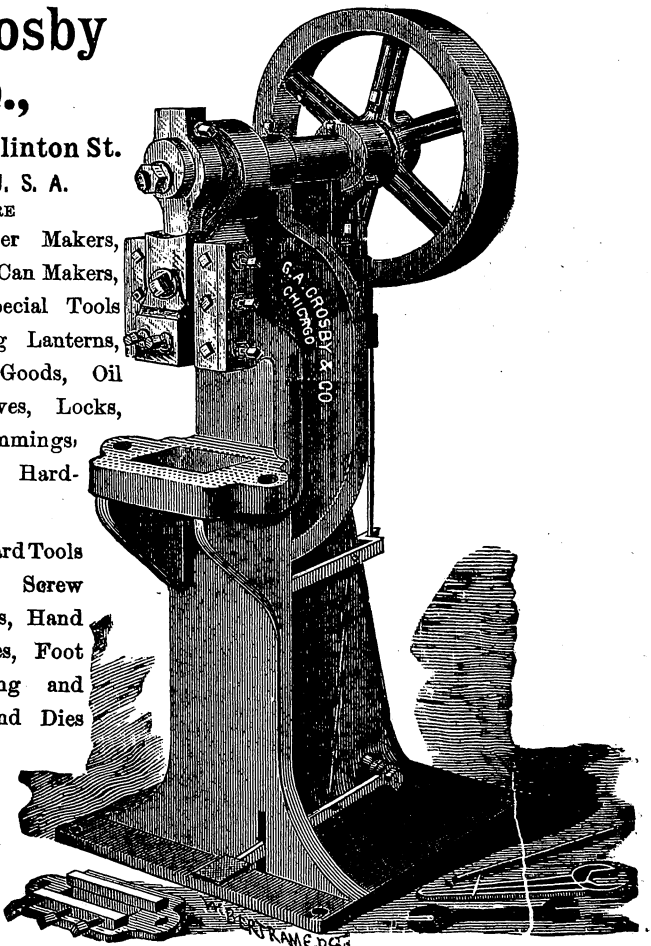
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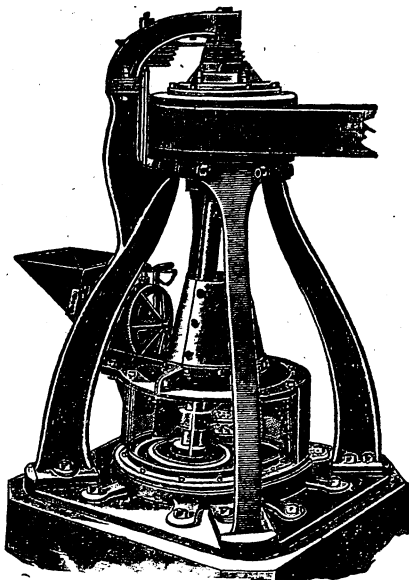
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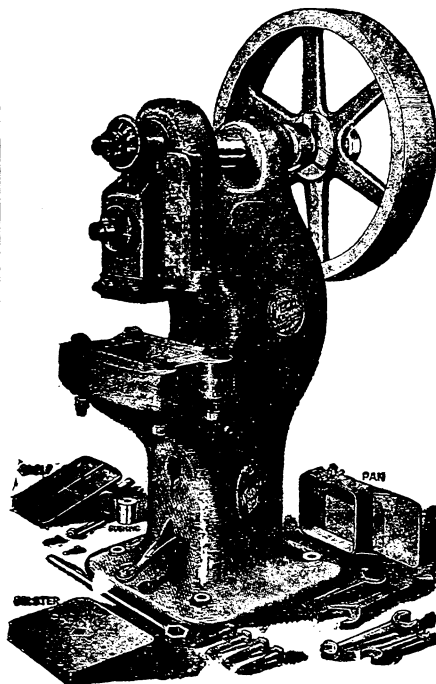
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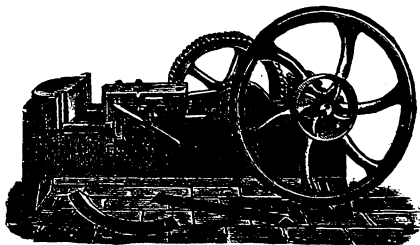
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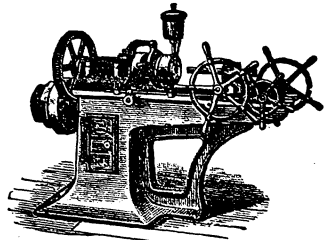


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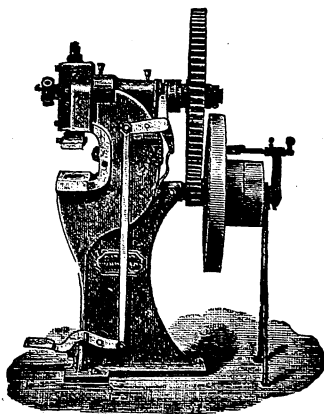
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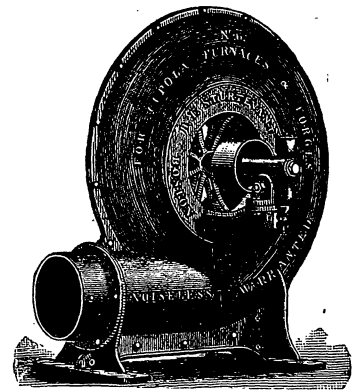
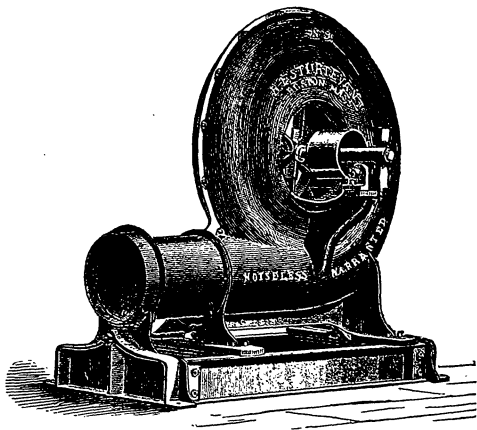
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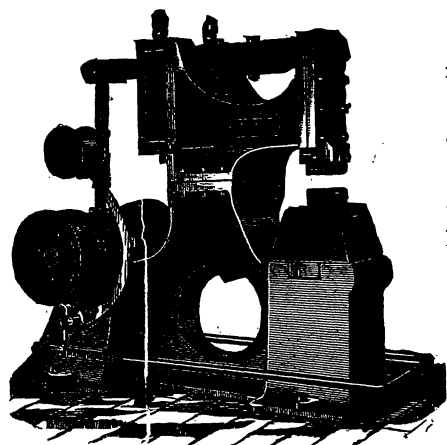
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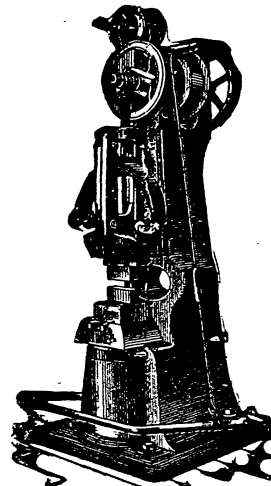
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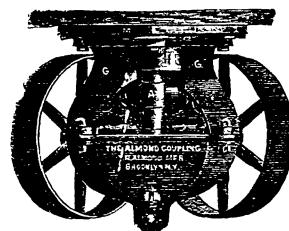
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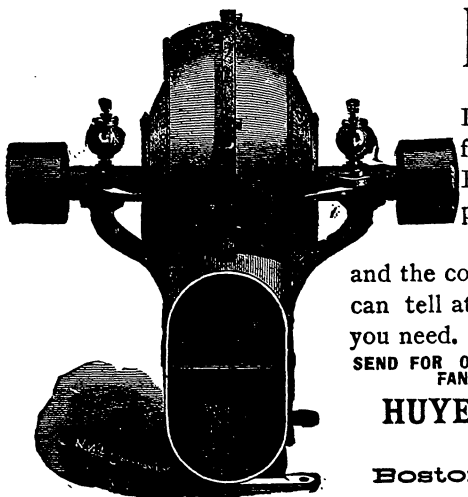


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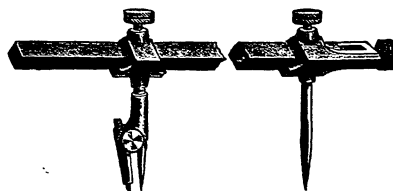
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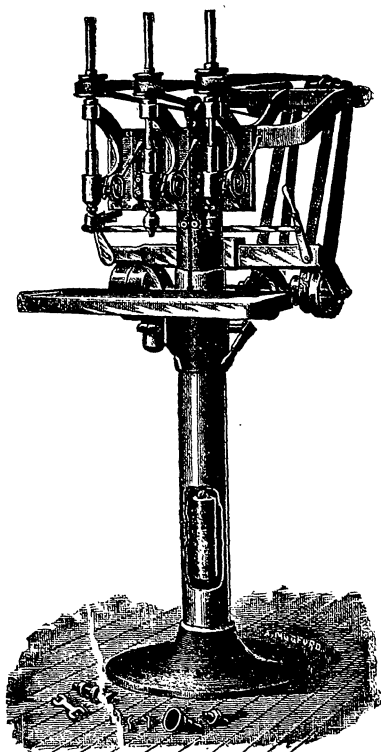


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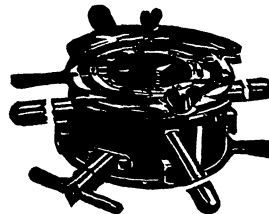
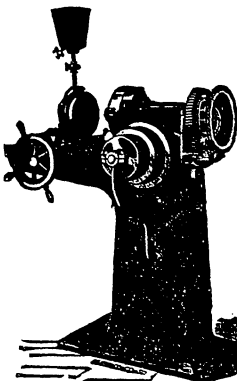
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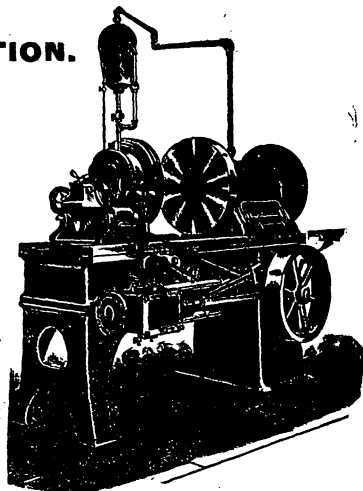
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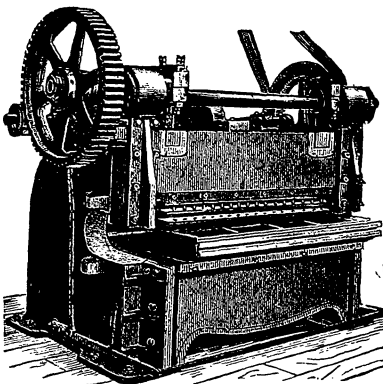
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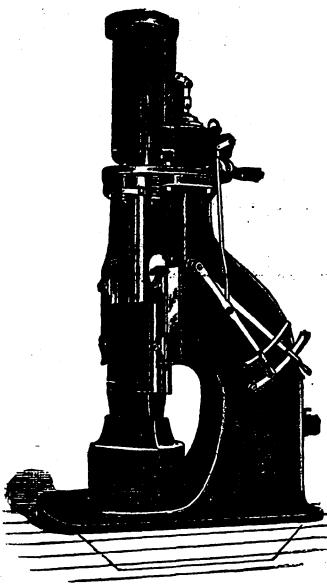
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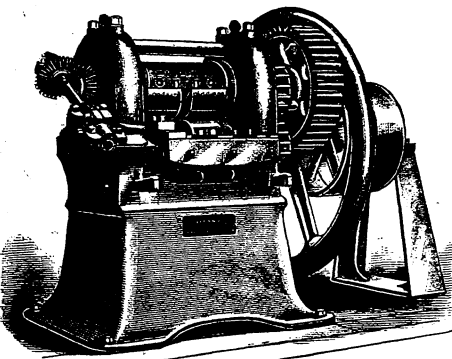
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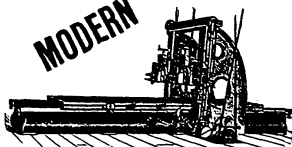
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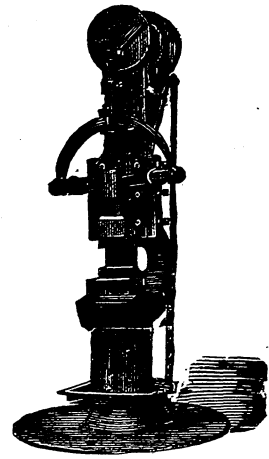
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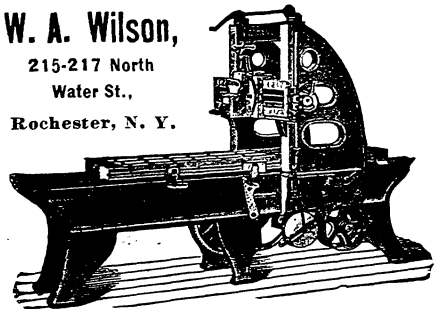
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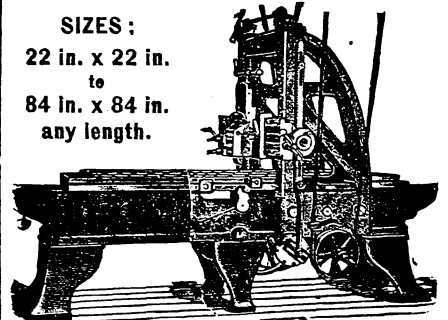
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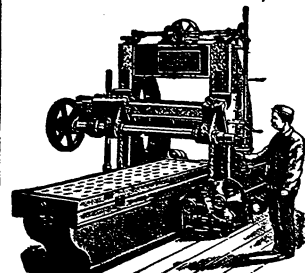


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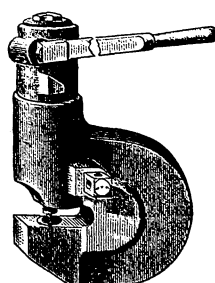
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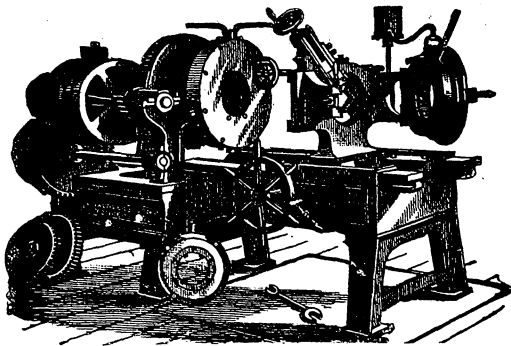
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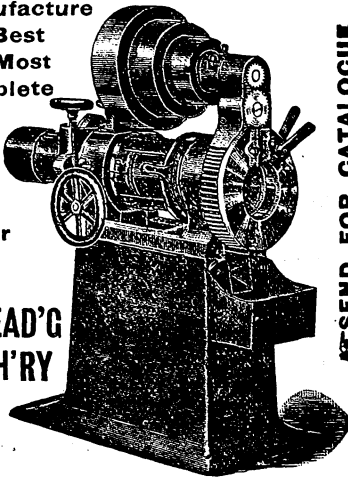
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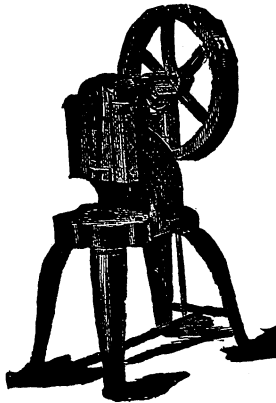
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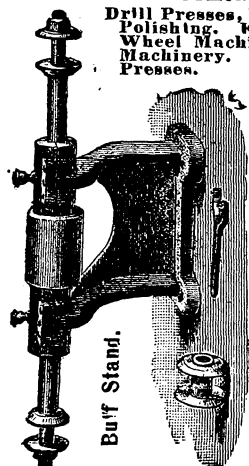
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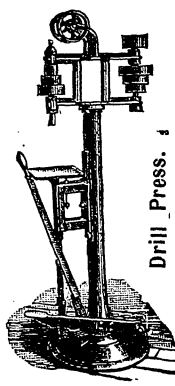
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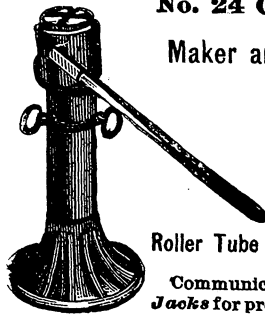
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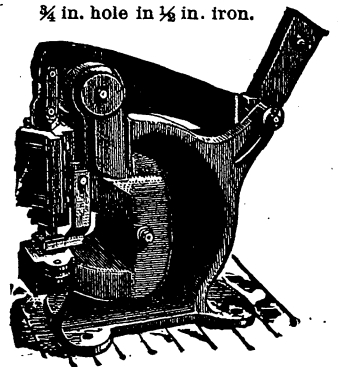
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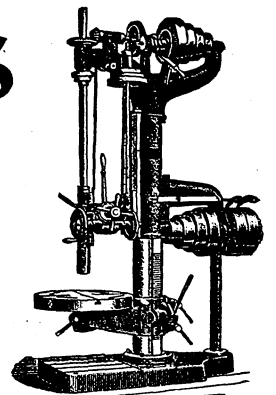
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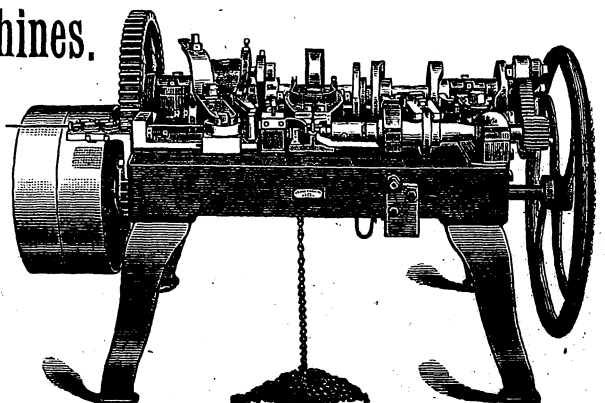
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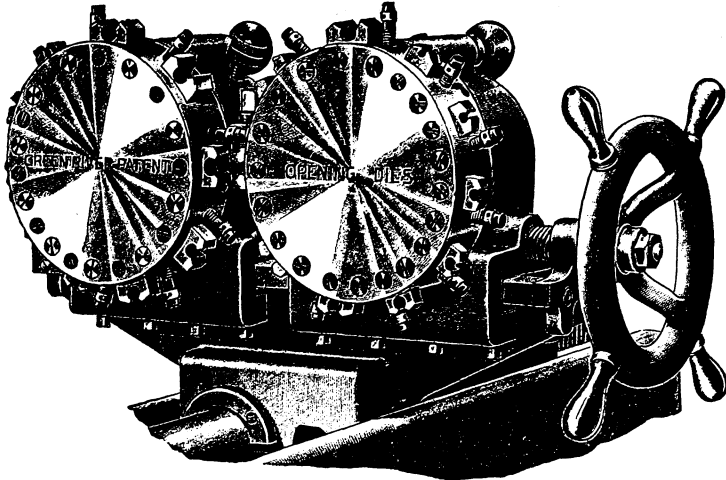
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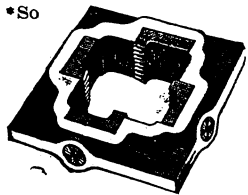
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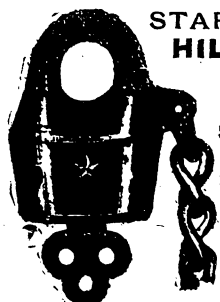
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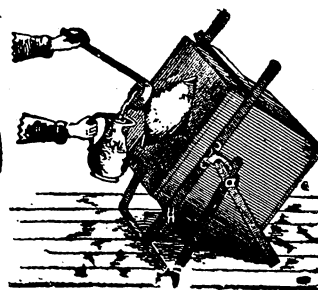
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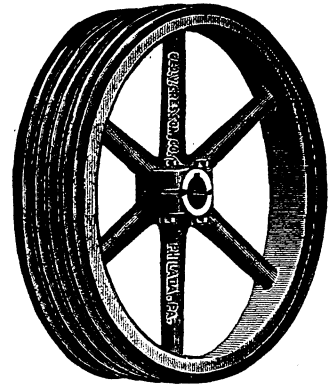
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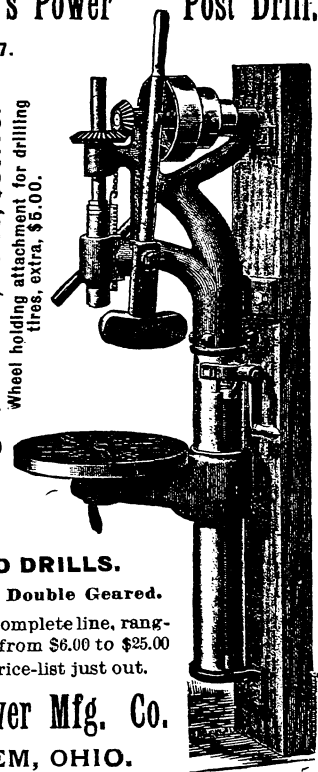
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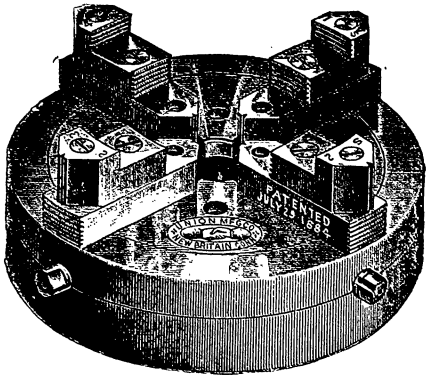
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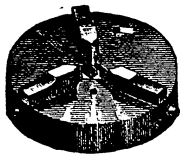
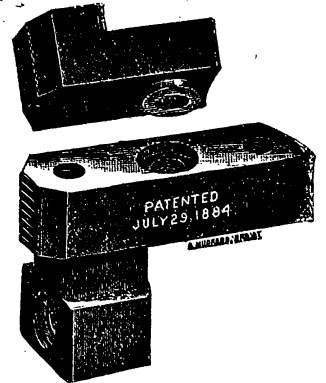
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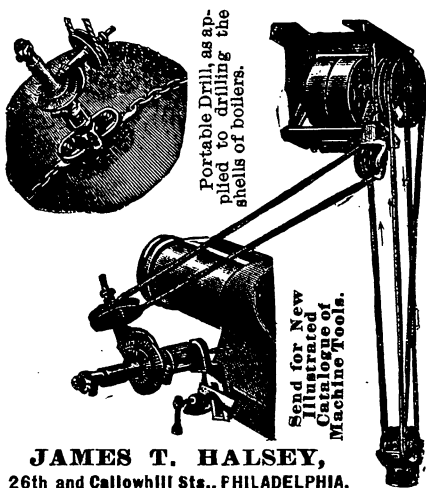
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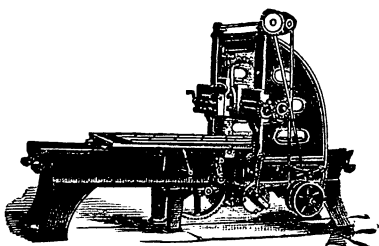
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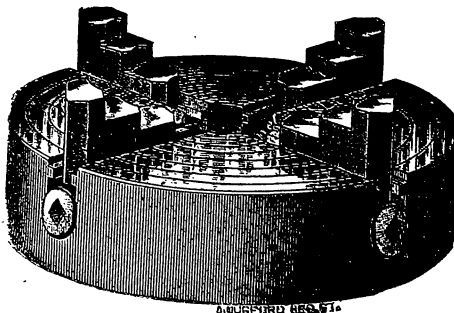
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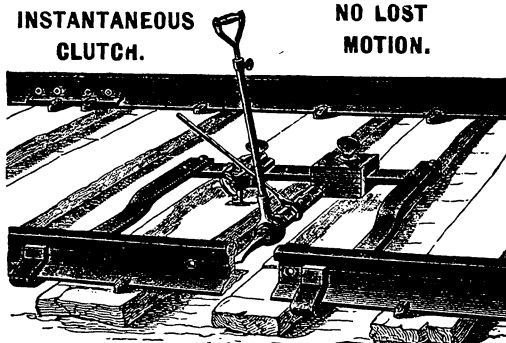
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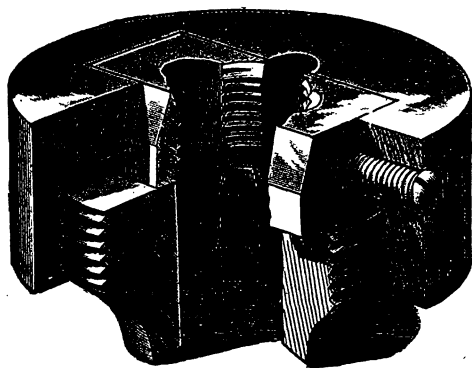


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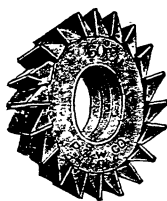
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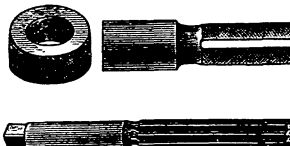


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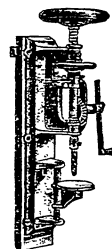
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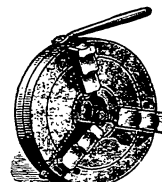
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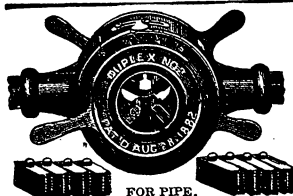
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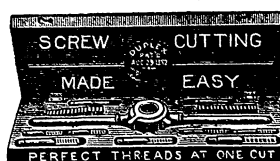
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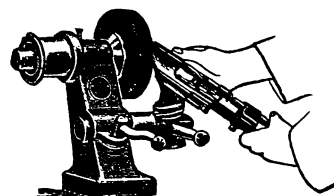
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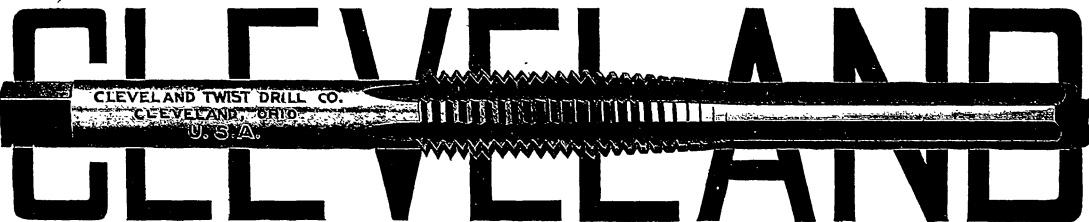
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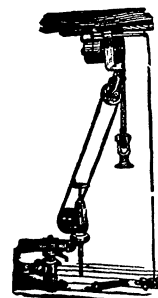
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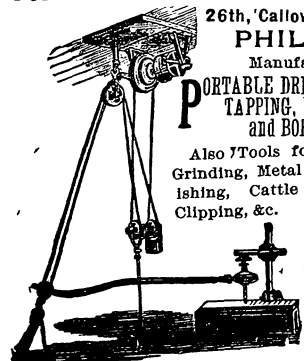
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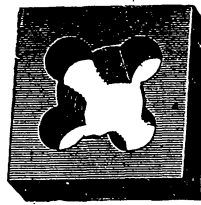
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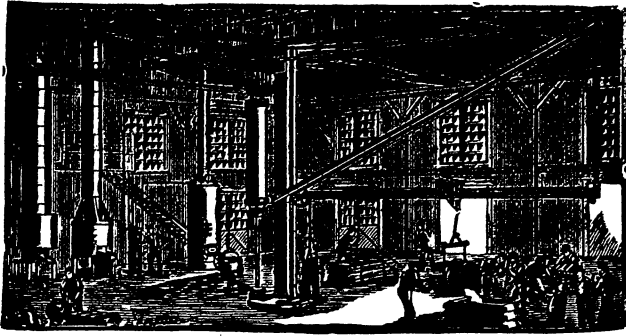
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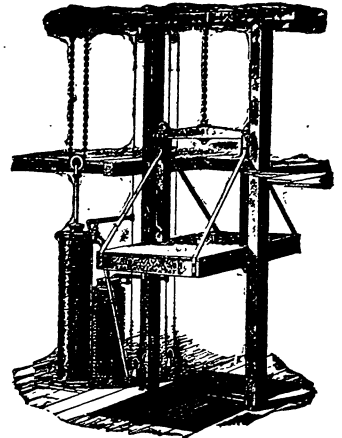


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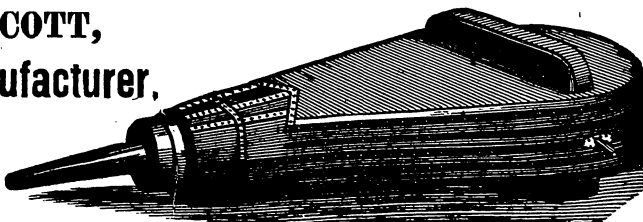
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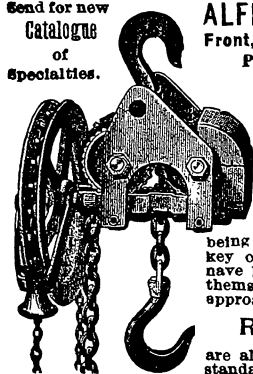
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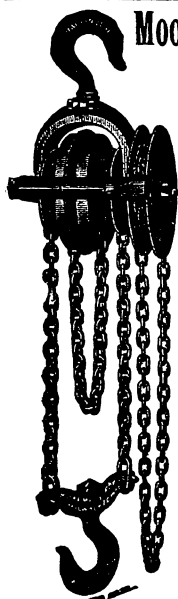
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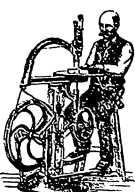
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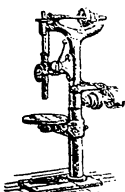
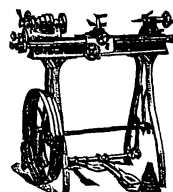
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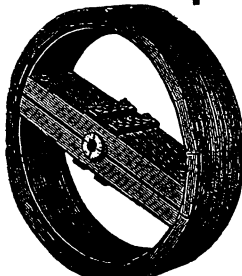
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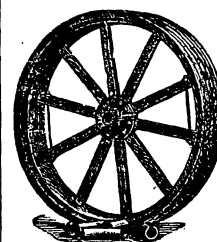
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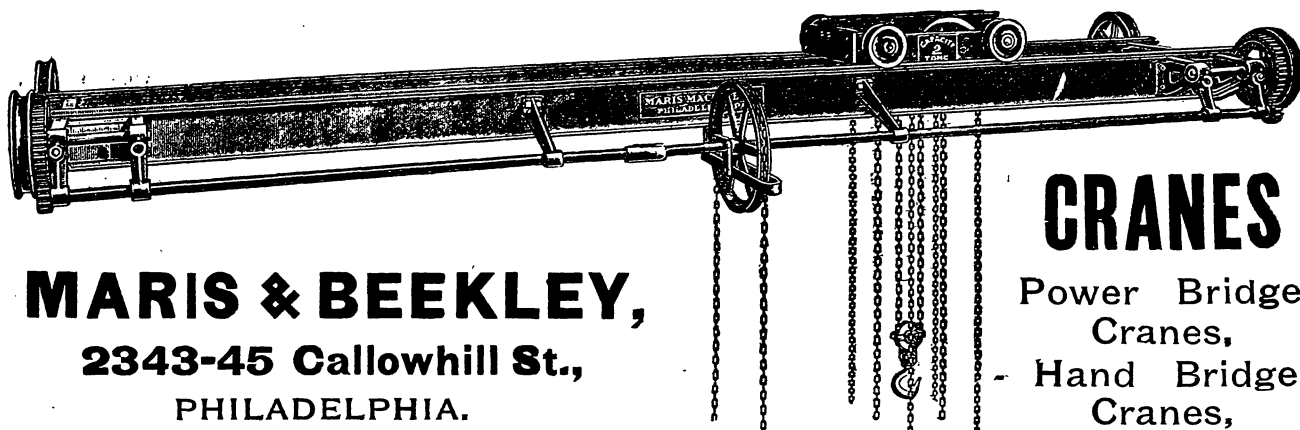
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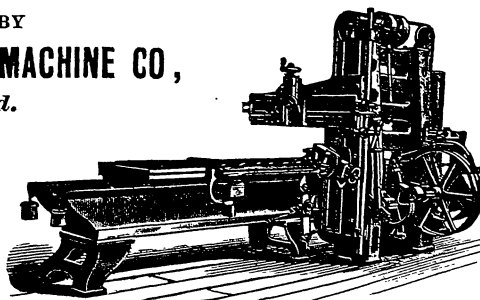
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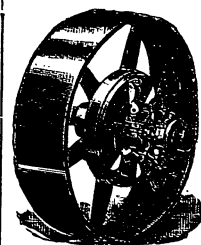
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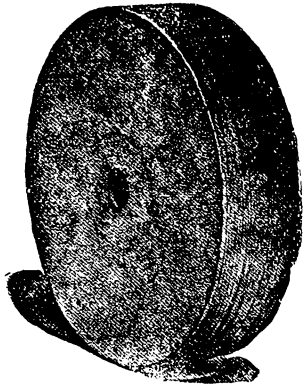
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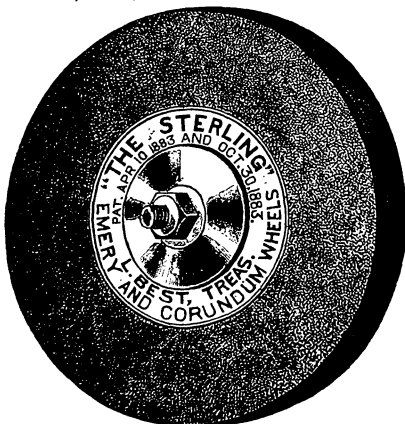


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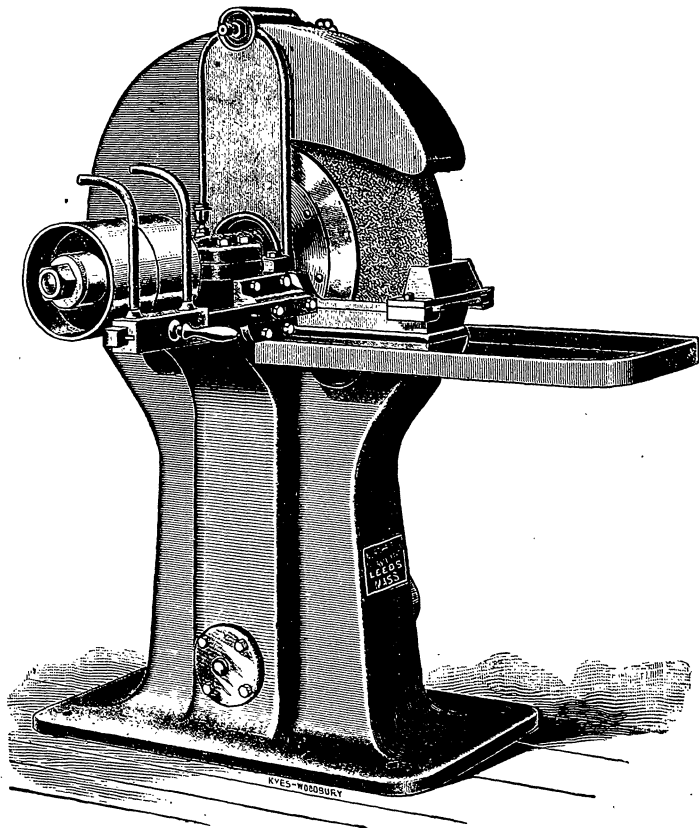
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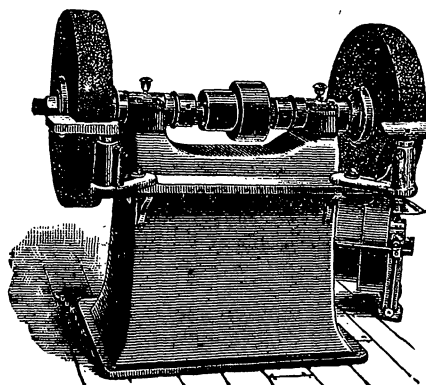
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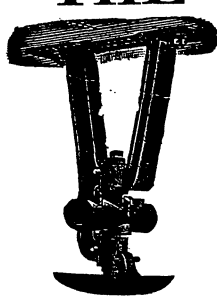
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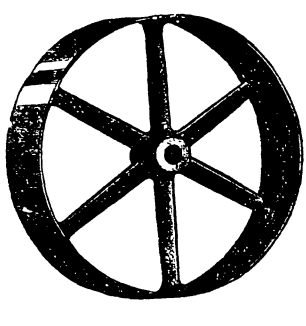
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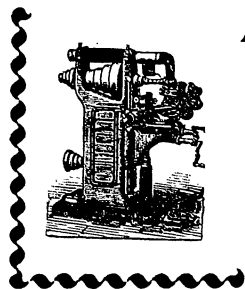
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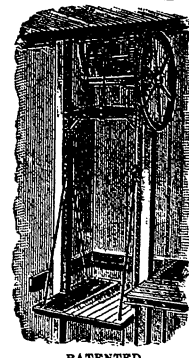
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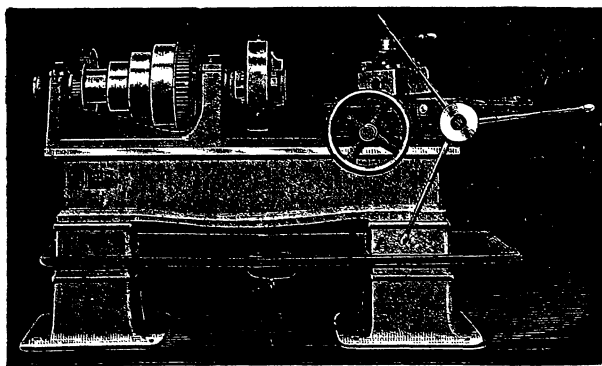
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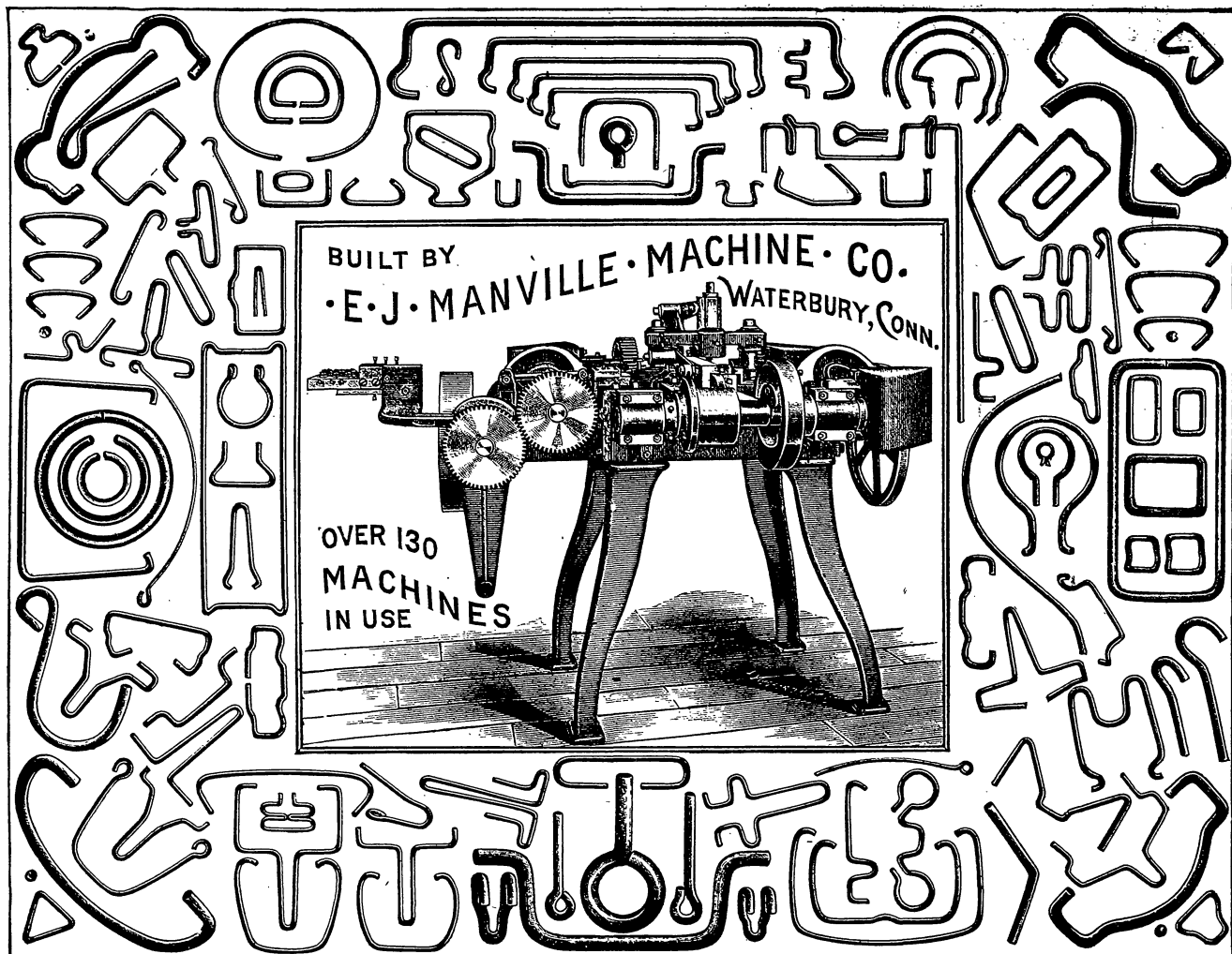


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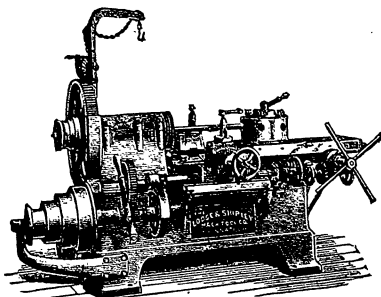
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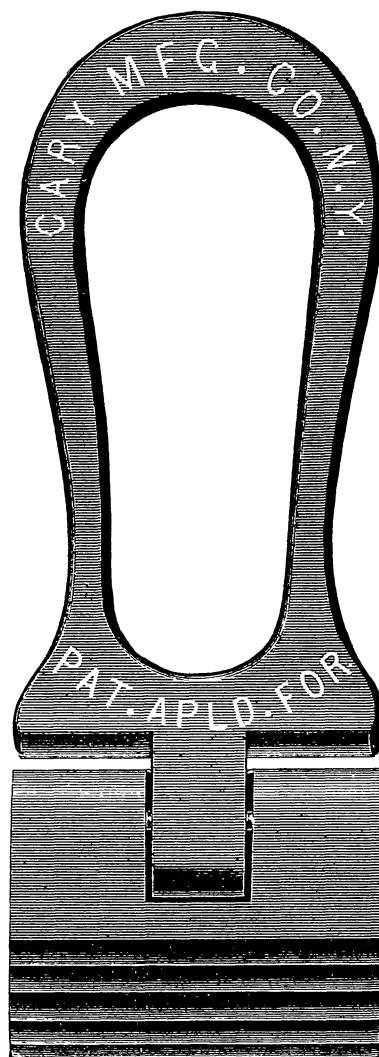
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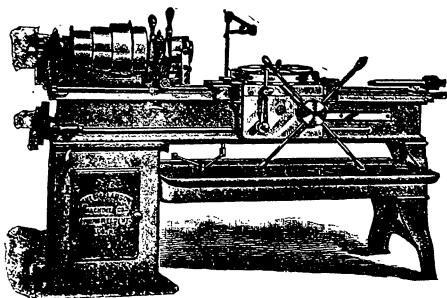
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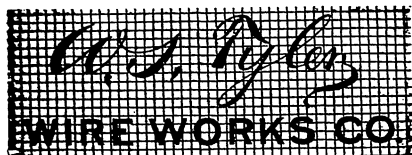
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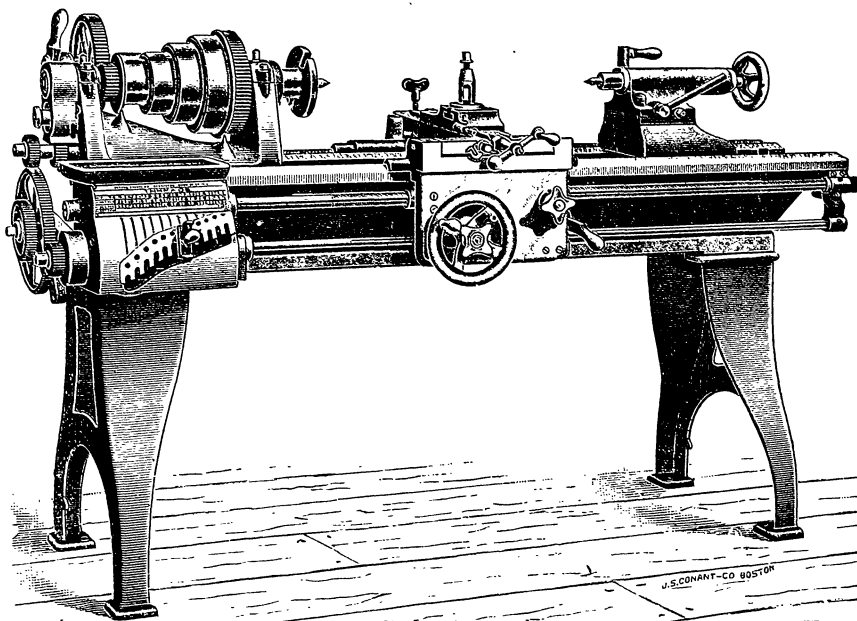
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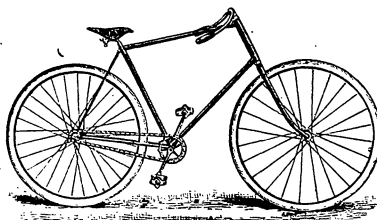
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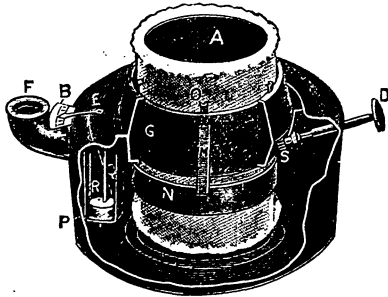


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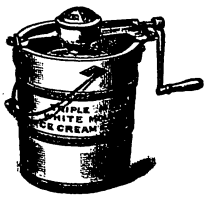
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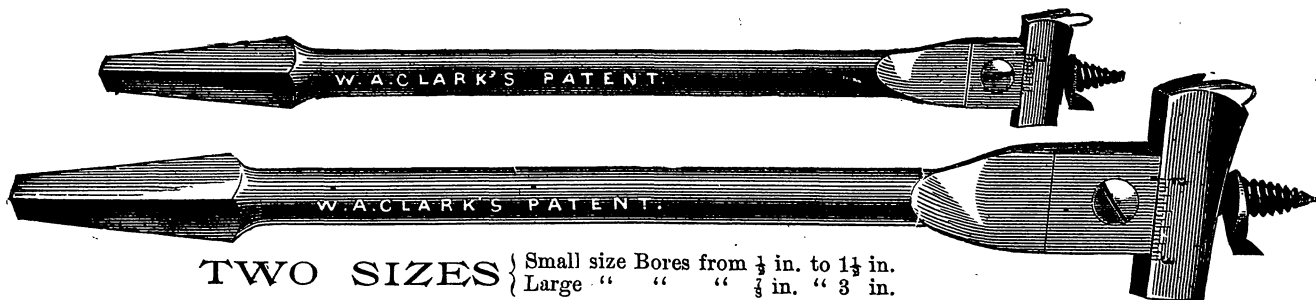
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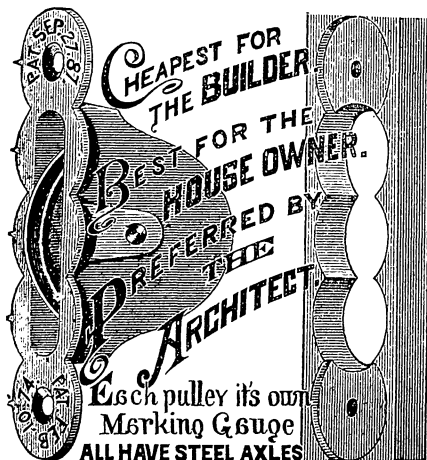
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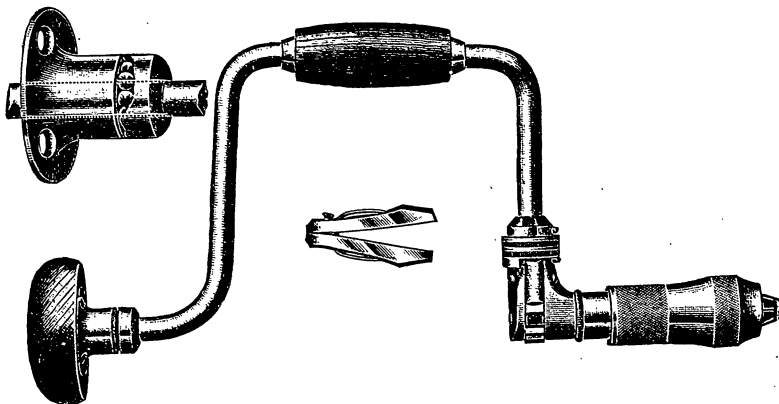
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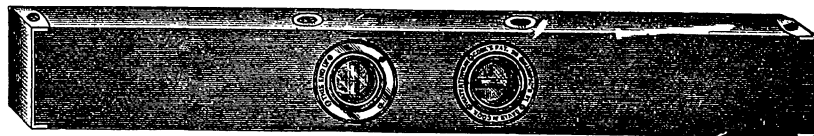


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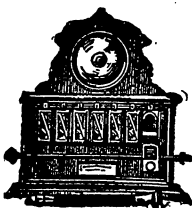


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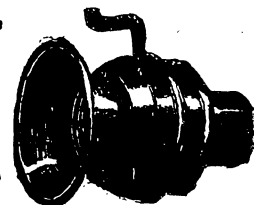
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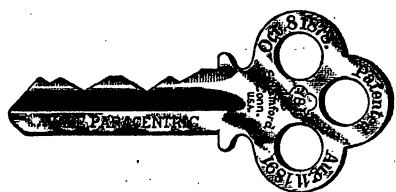
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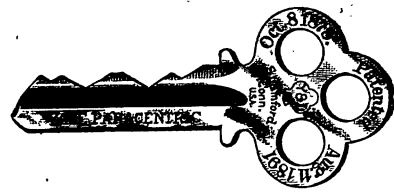
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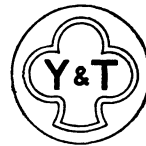
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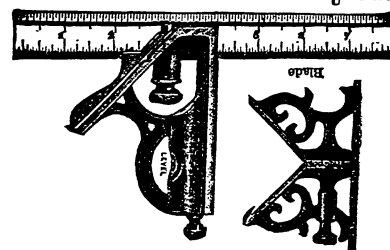
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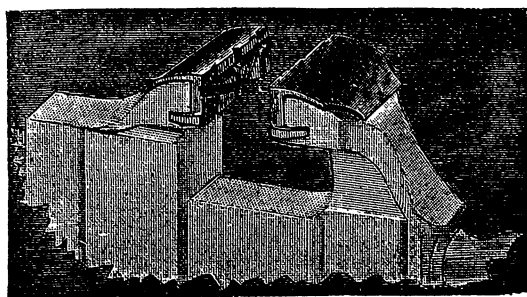
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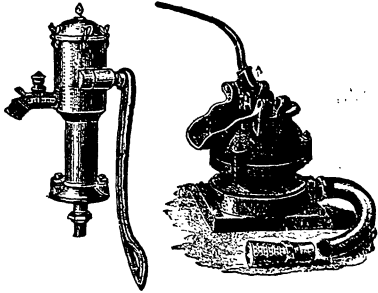
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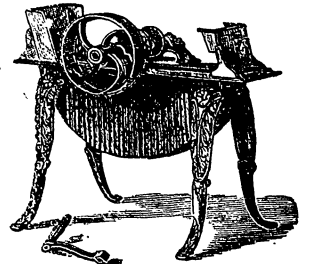
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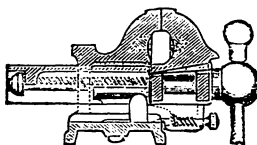
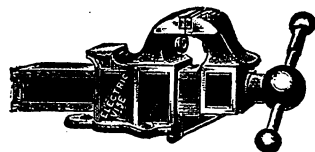
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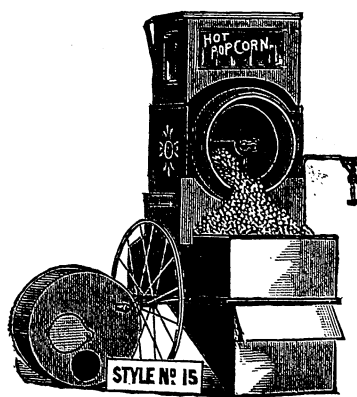
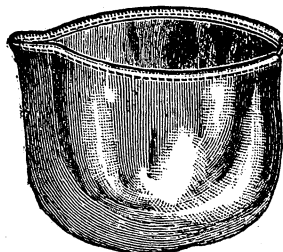
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Picks Apples, Pears, Plums and all small fruit. A necessity in every orchard. Have them in stock.

IRON INSTEAD OF WOOD.**GALVANIZED IRON TUBING and CURB,**

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CHAIN PUMPS,

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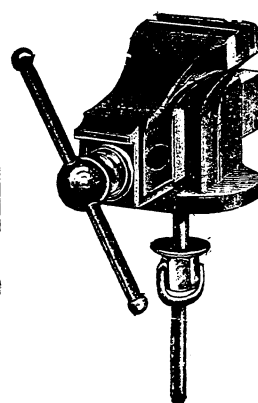
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They do not rust and accumulate filth—always clean. Extreme lightness is combined with strength and durability. No freezing. No waste of water by reason of enlarged reservoir at top of tubing. No annoying wheel at bottom. Easy to handle.

Tubing weighs less than 1/4 lb. per ft., is connected by couplings and can be attached to any make of curb.

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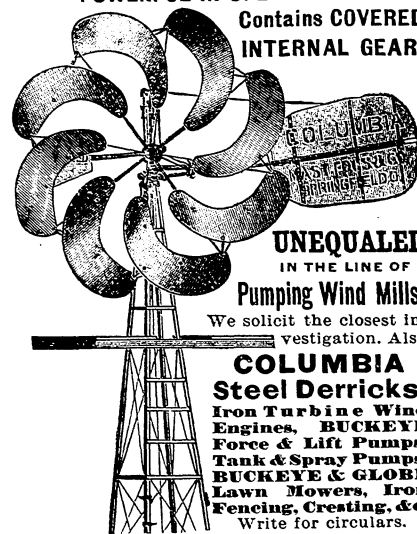
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Contains COVERED INTERNAL GEAR.

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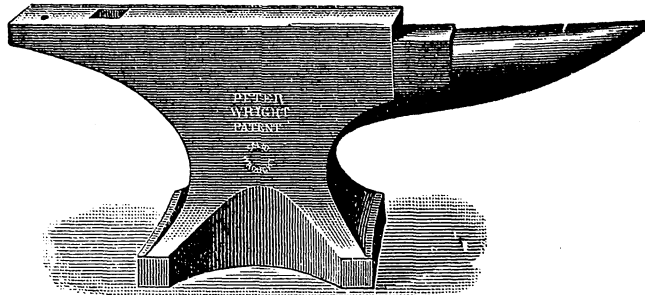
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Peter Wright's Patent Solid Wrought Anvil

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SOLID
WROUGHT

Fac-Simile of Trade-Mark.



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By Royal Letters Patent.

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The Sensible Saw Handle.



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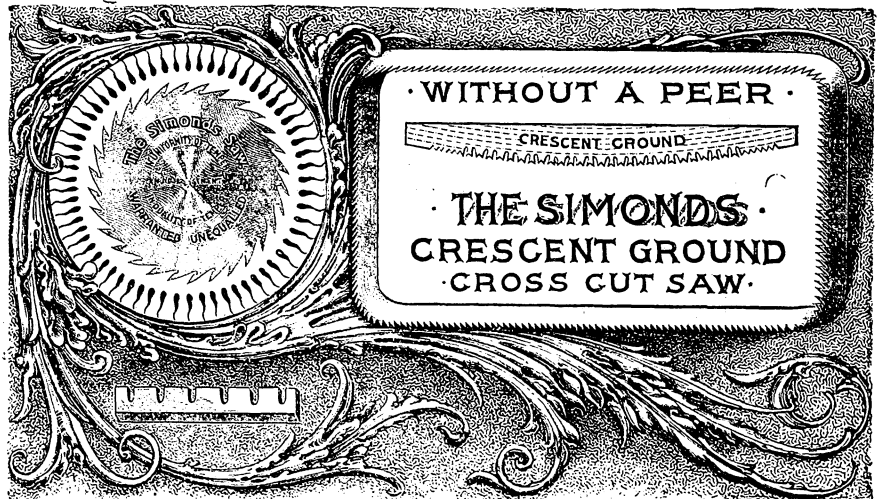
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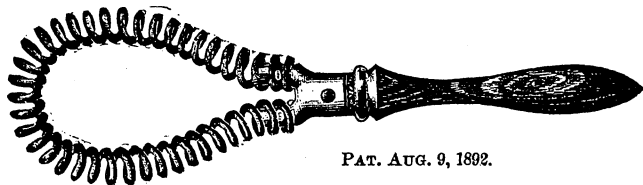


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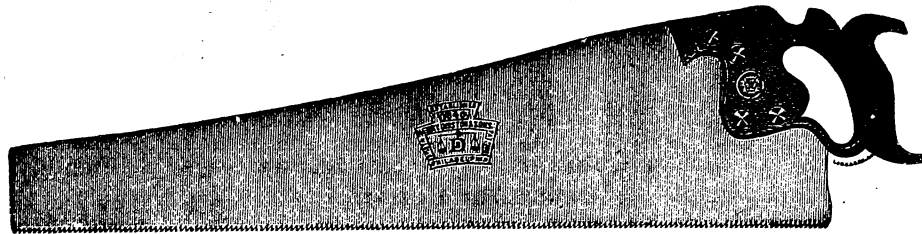
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"If you want a Saw it is best to get one with a name on it which has a reputation.
A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."—HENRY DISSTON.

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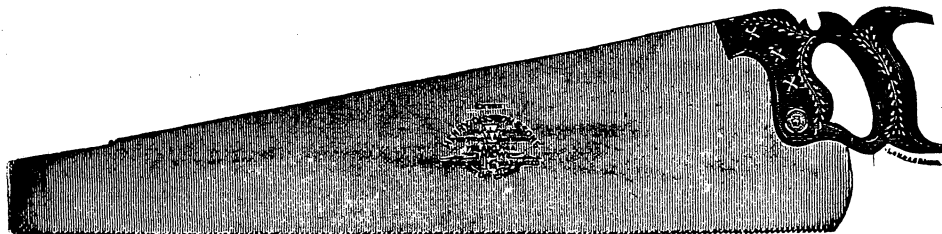
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SAW;"
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CHOOSE
IT,
AND
HOW
TO
KEEP
IN
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on
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This Saw combines all the valuable improvements in Hand Saws that have been made by us of late. The first and most important is the hollow or skew back, the success of which can best be attested by the number sold. The peculiar shape of the butt or heel, coupled with the new method of fastening to the handle, give a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop on the proper point and a greater command over your Saw, by reason of being two inches nearer the point, which must give more power.

The Saw being let into the handle on a circle, has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

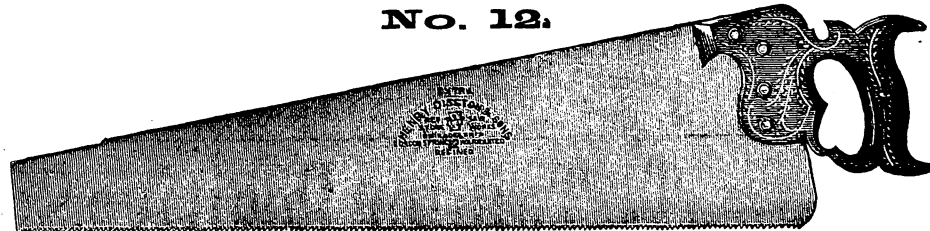
Our New No. 16 Premium Saw.



AN EXTRA FINE SAW IN EVERY RESPECT.

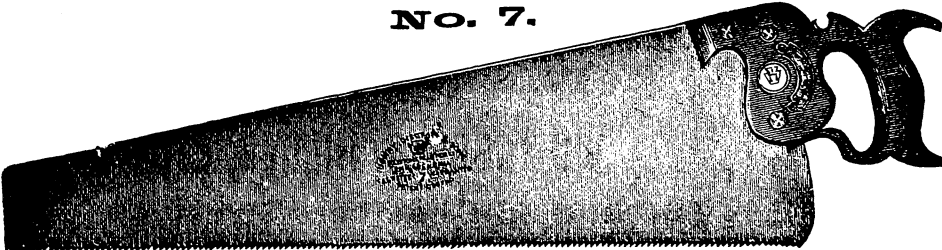
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No. 12.



DISSTON & SONS' Extra Refined London Spring Steel, Selected and highly Polished Blade, Handle Carved and Polished, 4 Improved Brass Screws, the finest Hand Saw manufactured.

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THE
SAWYER"
and
"LUMBER-
MAN'S
HAND
BOOK,"
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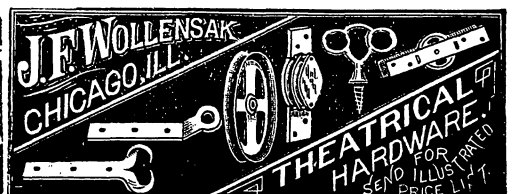
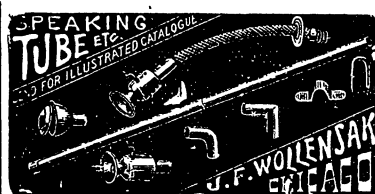
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STRONGEST	BANKER & WHITE,	LET
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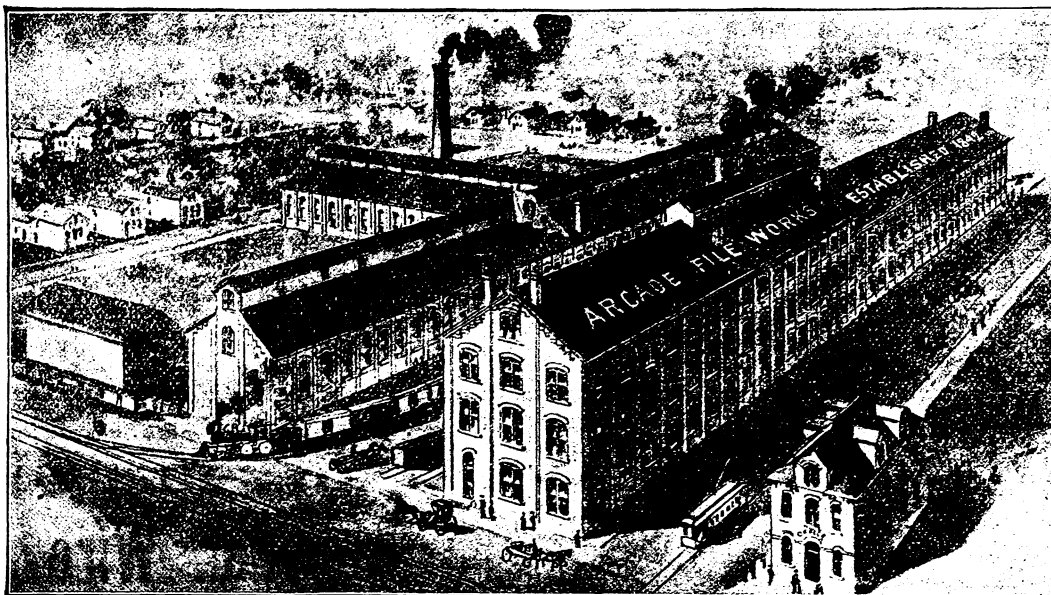
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Alfred Weed, Vice-Pres. & Gen. Manage

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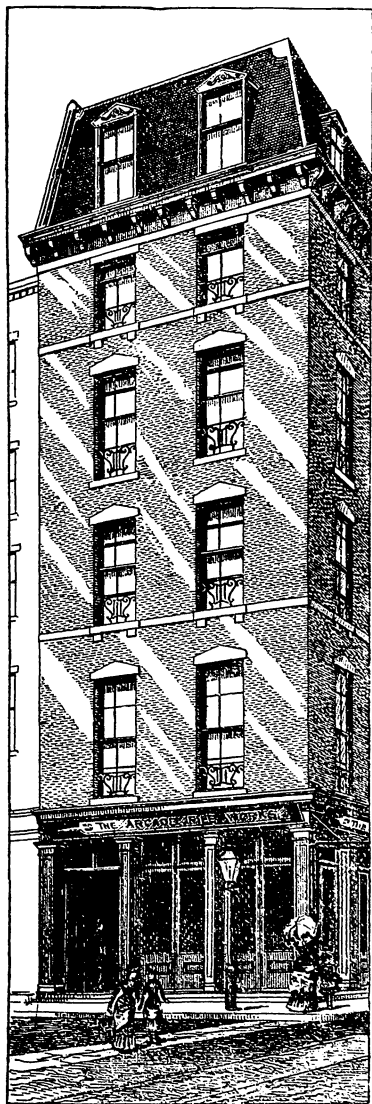
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Warehouse,
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New York
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Western
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Warehouse,
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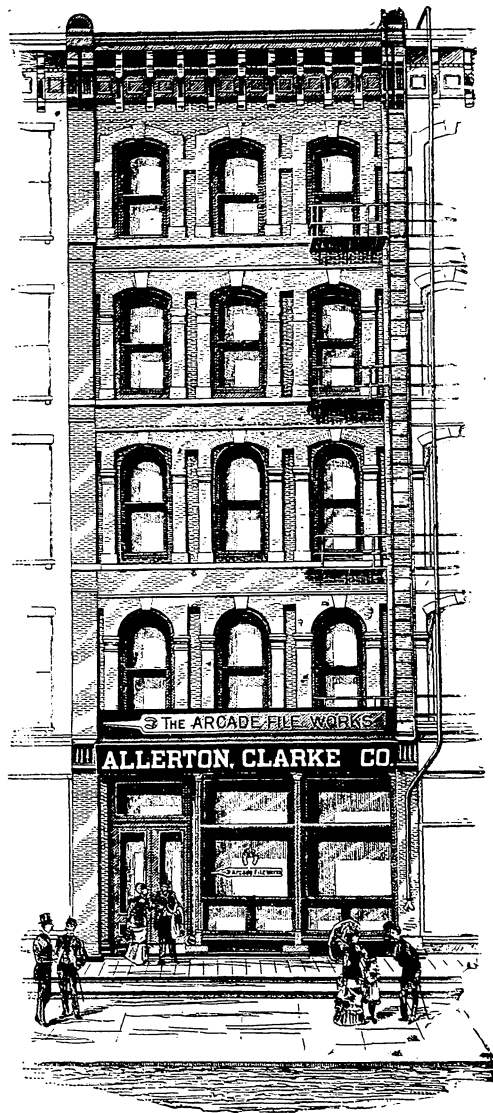
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factory and we can
assuredly say and main-
tain that we will sup-
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of **Files** in the mar-
ket.

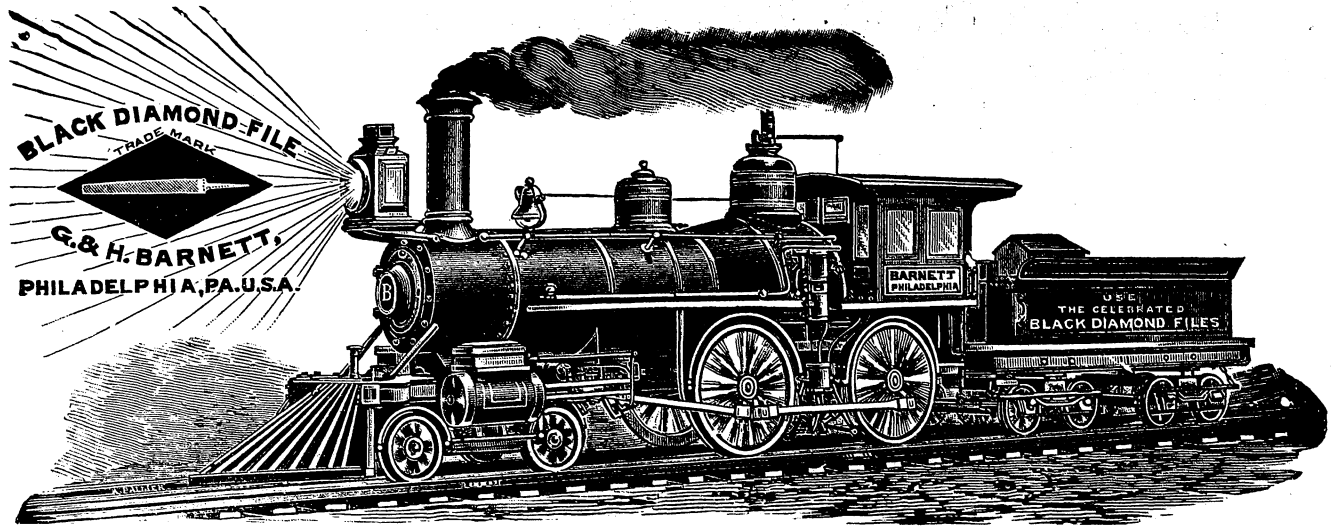
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heat of Natural Gas
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them superior to all
other brands.



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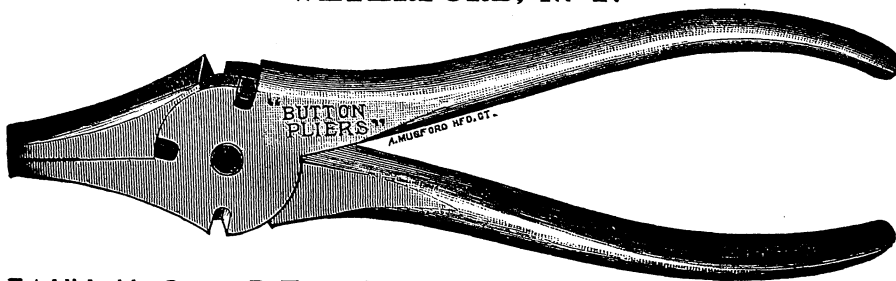
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**Pat. Wire Cutter
AND PLIER COMBINED.**

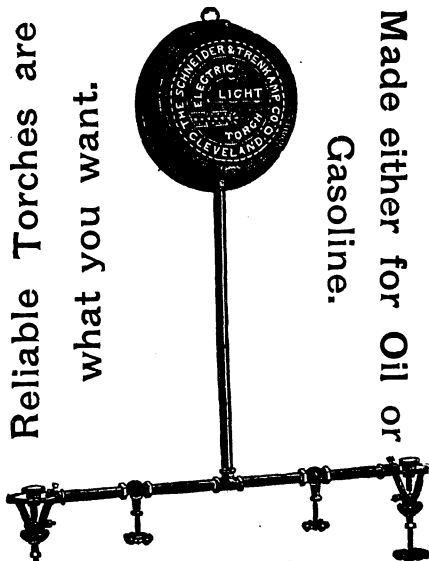
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Established by DANIEL B. KING, 1829.



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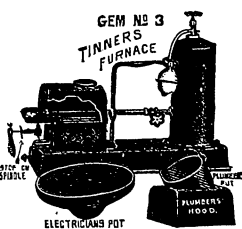
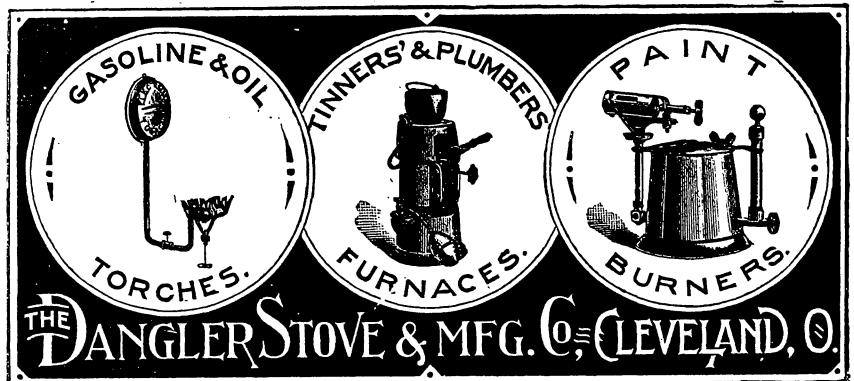
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These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

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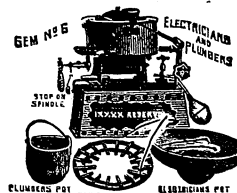


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All are equipped with the cylindrical slotted burner. For sale by all first class jobbers, or write us for descriptive circulars.

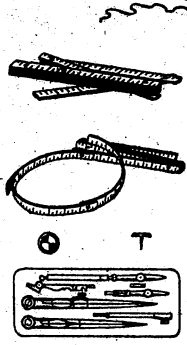
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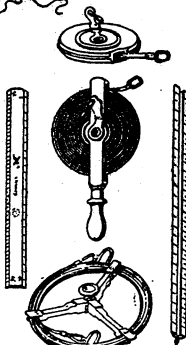
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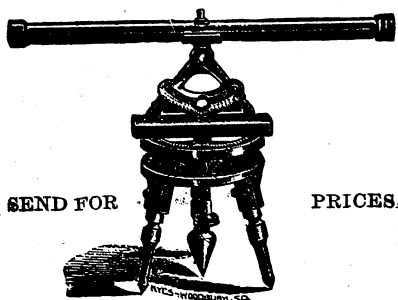
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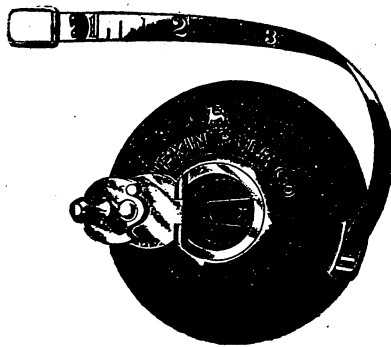


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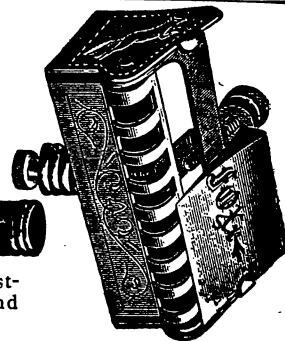
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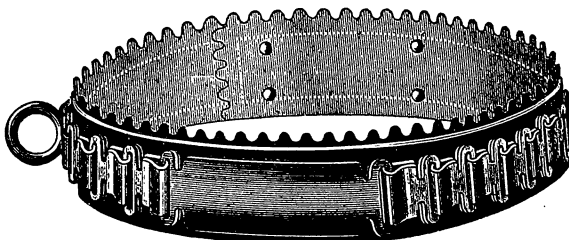
KELLEY'S PATENT DOG COLLARS,

**HALTER
CHAINS,**

Dog Leads

AND

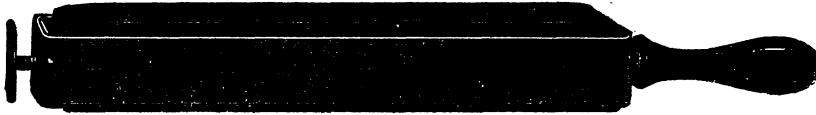
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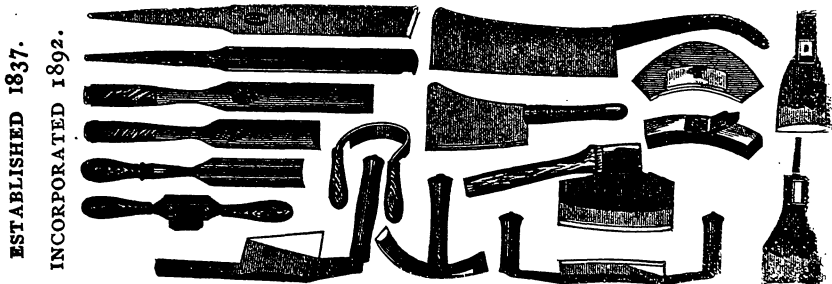
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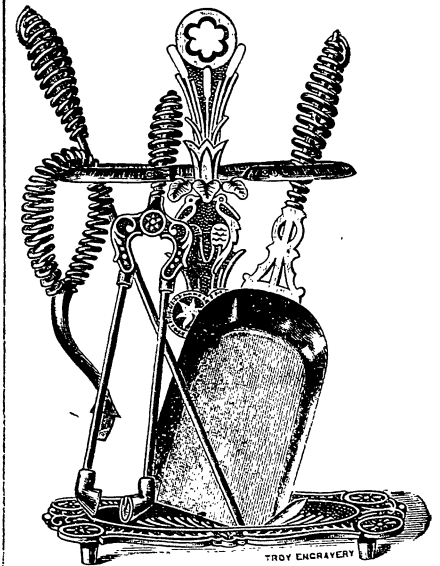
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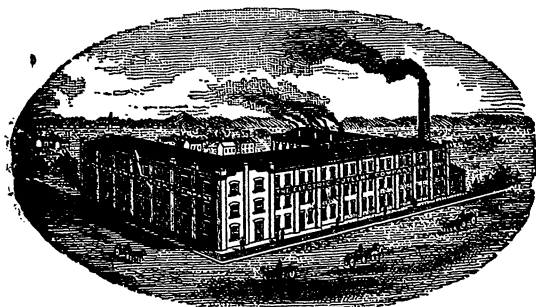
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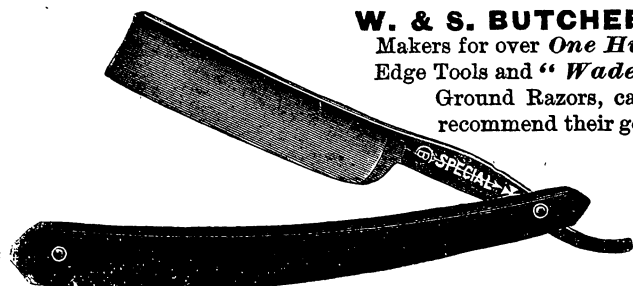
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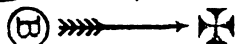
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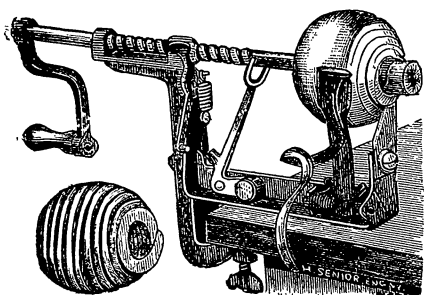
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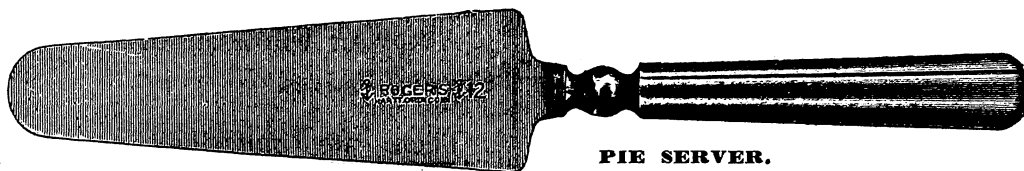
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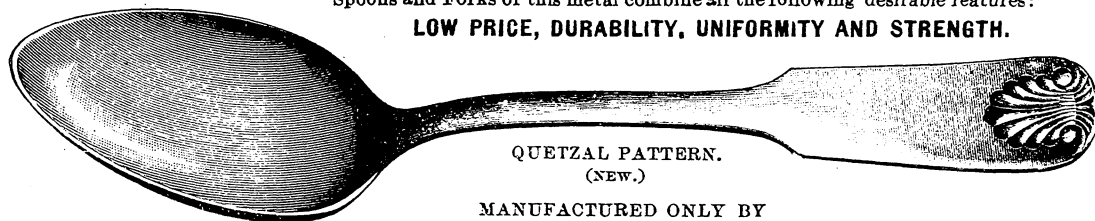
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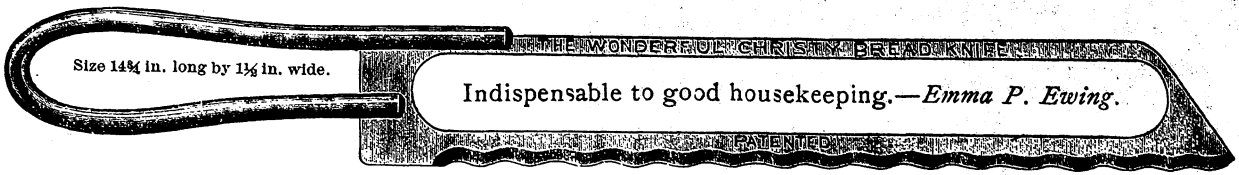
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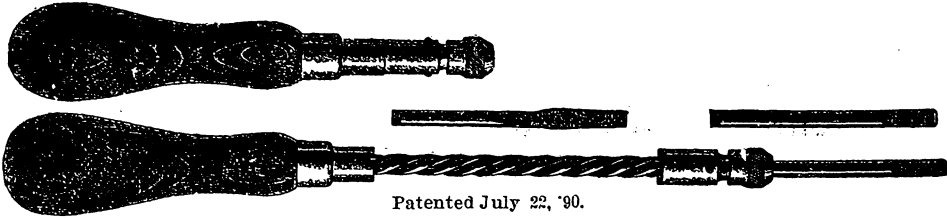
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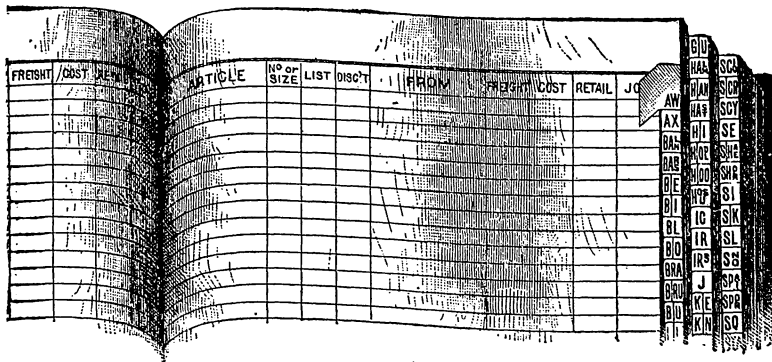
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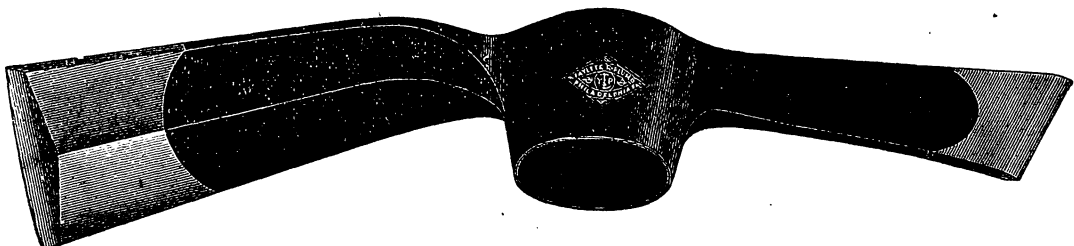
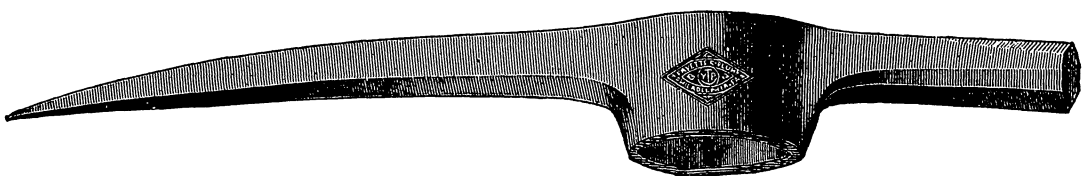
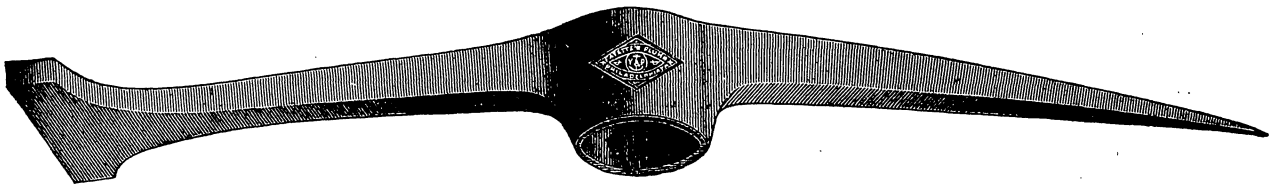
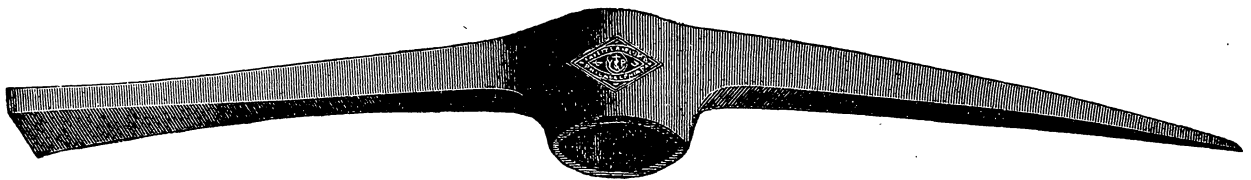
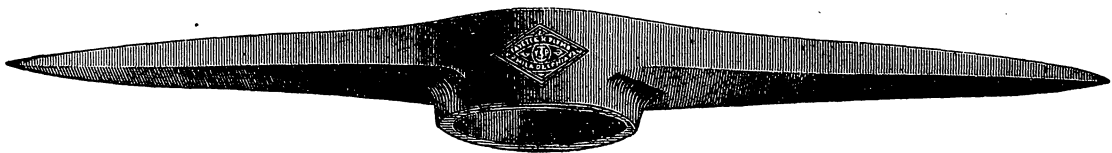
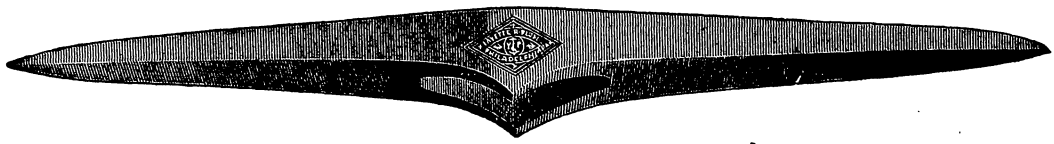
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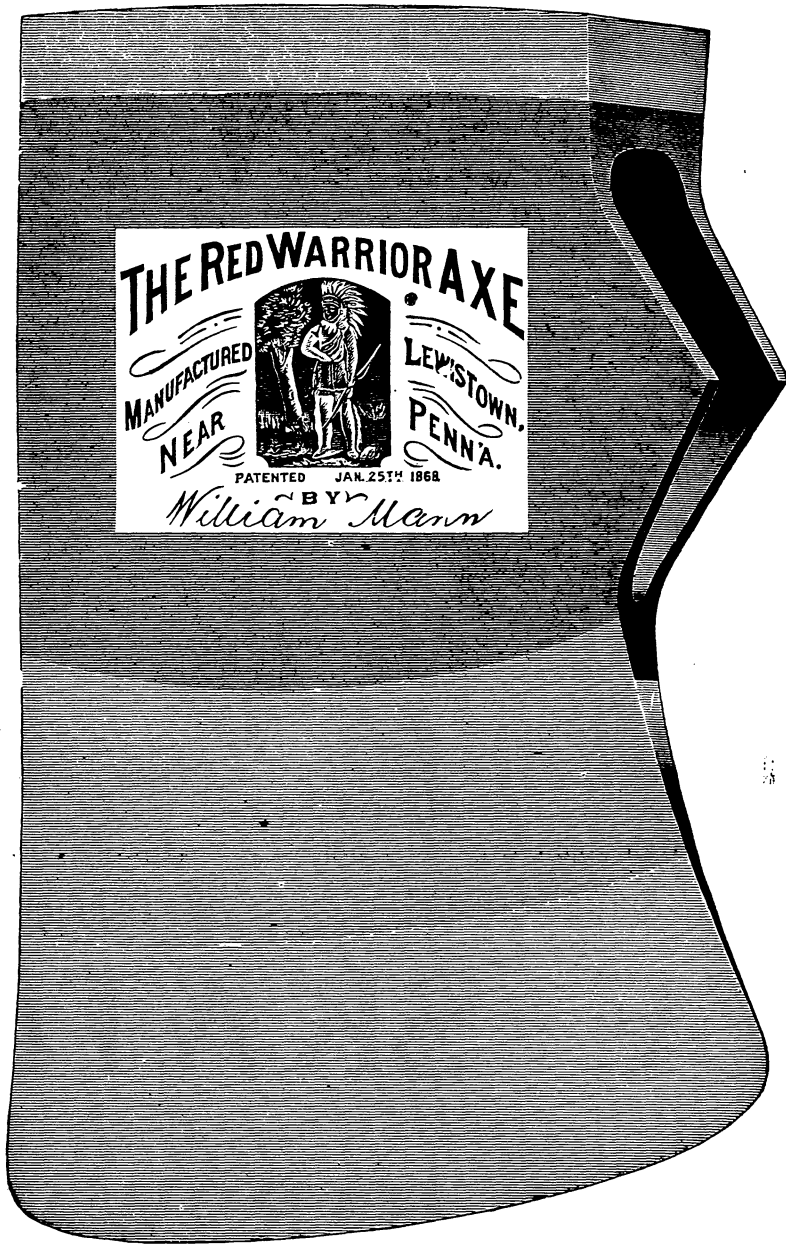
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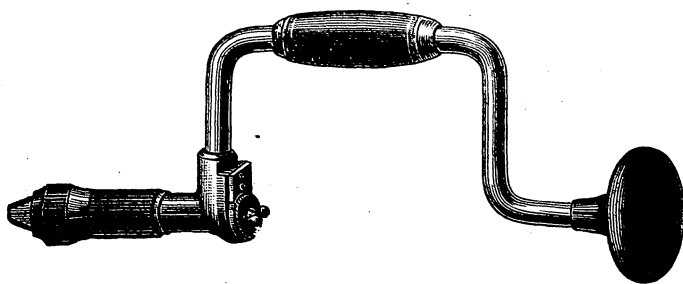


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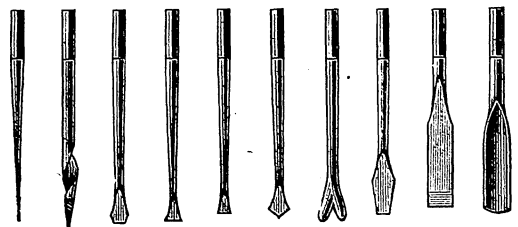
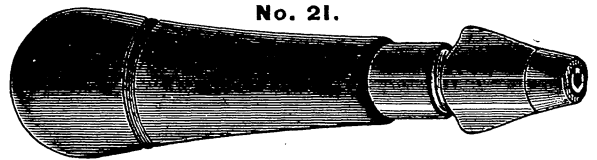
Standard Screw Driver.



Patented March 25th, 1890.

Standard Tool Handle.

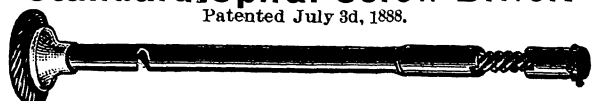
No. 21.



Patent Applied for.

Standard Spiral Screw Driver.

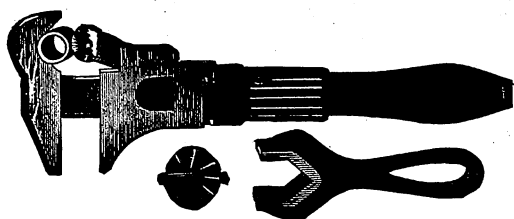
Patented July 3d, 1888.



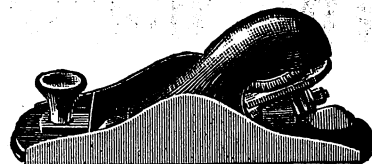
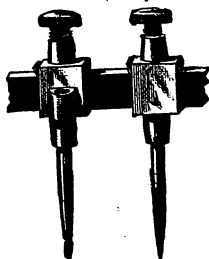
CHANTRELL TOOL CO., Manufacturers,

- - - READING PA.

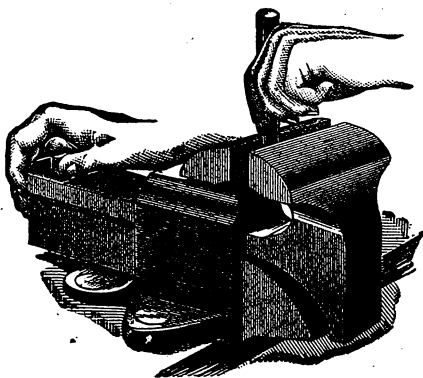
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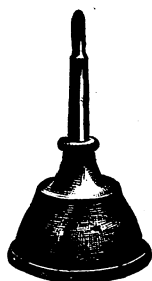
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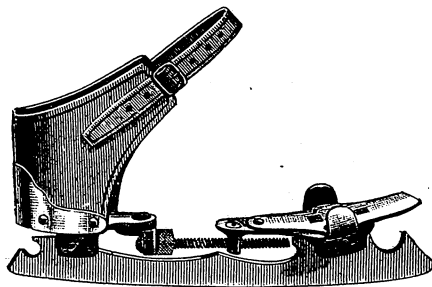
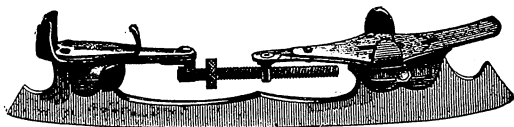
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

ICE SKATES

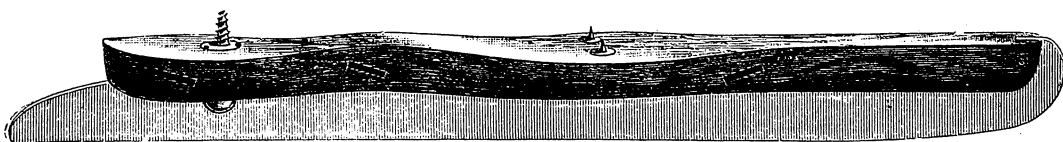
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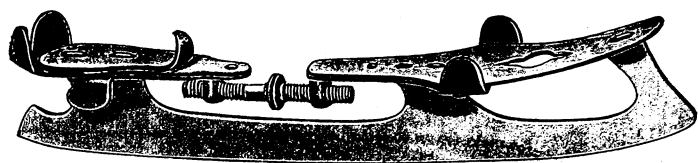
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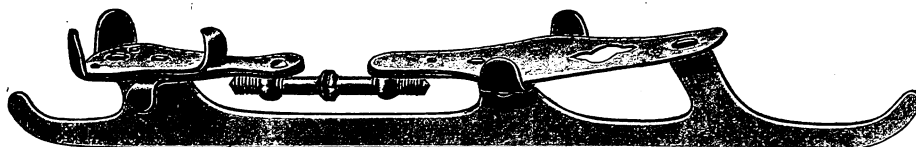
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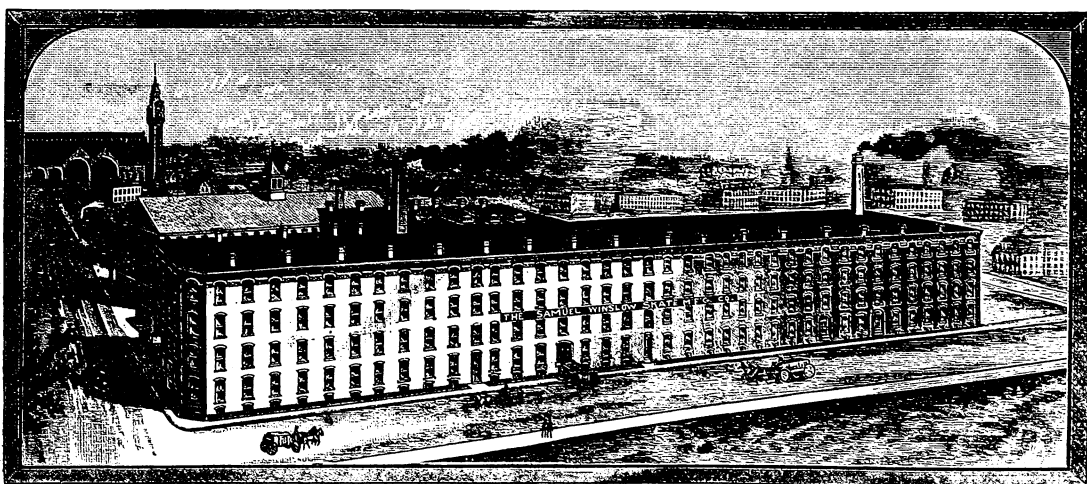
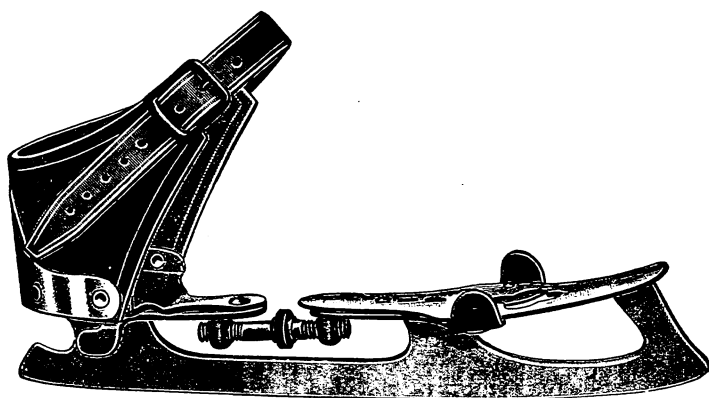
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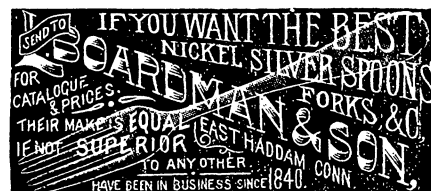


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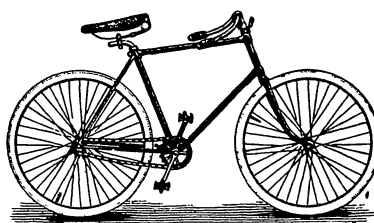
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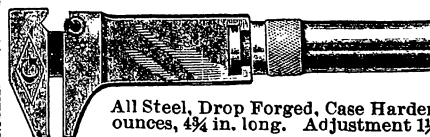
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WITH SPOKE GRIP ATTACHMENT.

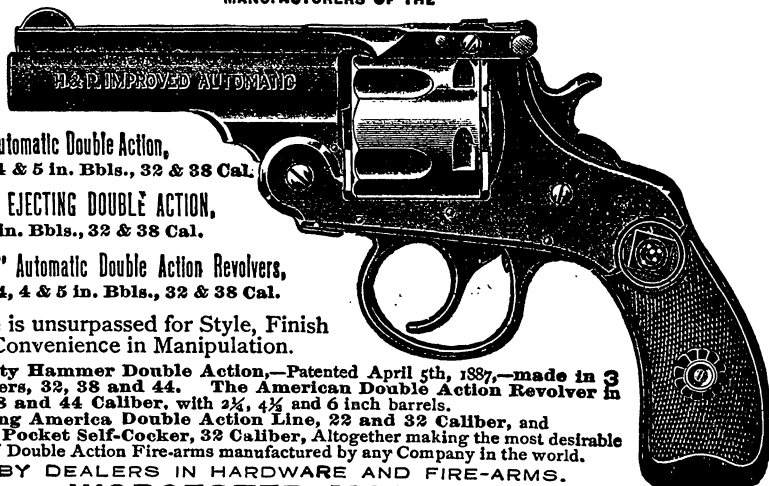
All Steel, Drop Forged, Case Hardened. Lightest, neatest and strongest. Weighs 5½ ounces, 4¼ in. long. Adjustment 1¼ in. Write for prices and descriptive circular.

Manufactured by the

GENDRON IRON WHEEL CO., TOLEDO.

Harrington & Richardson Arms Company,

MANUFACTURERS OF THE



Improved Automatic Double Action,
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

IMPROVED EJECTING DOUBLE ACTION,
3 1-4 in. Bbls., 32 & 38 Cal.

"Premier" Automatic Double Action Revolvers,
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

This line is unsurpassed for Style, Finish and Convenience in Manipulation.

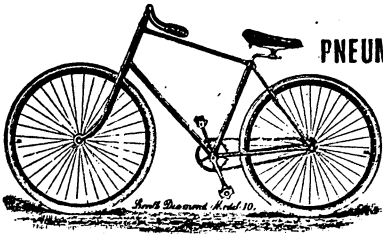
The Safety Hammer Double Action.—Patented April 5th, 1887,—made in 3 Calibers, 32, 38 and 44. The American Double Action Revolver in 32, 38 and 44 Caliber, with 2½, 4½ and 6 inch barrels. The Young America Double Action Line, 22 and 32 Caliber, and The Vest Pocket Self-Cocker, 32 Caliber, Altogether making the most desirable line of Double Action Fire-arms manufactured by any Company in the world.

SOLD BY DEALERS IN HARDWARE AND FIRE-ARMS.
WORCESTER, MASS., U. S. A.

THE CLARK MFG. CO.,

Blind Hinges, Gate Hinges, Door Butts,
And other **HARDWARE SPECIALTIES**
BUFFALO, N. Y.

Lovell Diamond Cycles



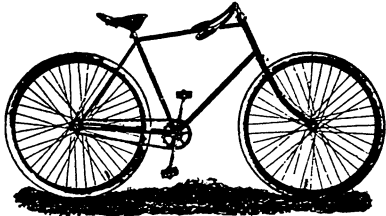
HIGHEST GRADE.
PNEUMATIC, CUSHION AND SOLID TIRES.
FOR LADIES AND GENTLEMEN.

MANUFACTURED BY
John P. Lovell Arms Co.

BOSTON, MASS.
CYCLE CATALOGUE FREE.

WESTERN WHEEL WORKS.

BICYCLE



MANF'TRS

From \$20

to \$135.

MOST COMPLETE LINE MADE.

OFFICE AND FACTORY:

Wells, Schiller and Sigel Sts., and N. Park Ave., Chicago, Ill., U.S.A.

A Wheel



Properly Designed,
Practically Made,
Combining Strength,
Durability and
Perfect Qualifications.
Such are the

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Dauntless

FALCON JUNIOR, for Boys.

FALCON JUNIOR COMBINATION,

for Boys and Girls.

The only high grade juvenile wheels made. Full ball bearings, perfectly dust proof, 1½ in. pneumatic tire, 24 in. wheels, graceful drop handle bars, combination cork and rubber handles.

The bearings are turned out of solid bar steel, and all material and workmanship are first-class. Made in the same manner, of the same stock, with the same care as the large wheels. Good juvenile wheels are scarce, and ours are going rapidly.

The W. Bingham Company, CLEVELAND, OHIO.

DETROIT CORK-SCREW CO.,

DETROIT, MICH., U. S. A.

Manufacturers of

The Davis Cork-Screw,
The Davis Knife and Cork-Screw,
The Puddefoot Cork-Screw,
Columbus and Greely
Cork Extractors.

Manufacturers of

Cut Worm
Spiral Screws and
Cork-Screw Novelties.
Cut Worm Cork-Screws
for the Bar Cork Puller

Send for Price-List and Discounts.

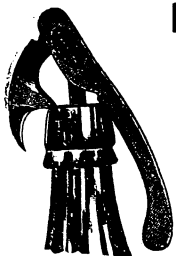


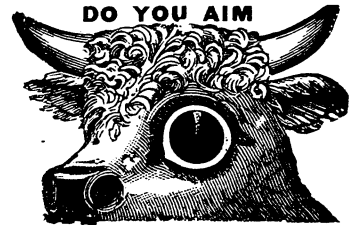
FIG. 3. Showing Davis cork-screw and fulcrum in position to pull cork.

Yacht and Boat Hardware.

L. W. FERDINAND & CO.,

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Send for 212-Page Catalogue.



To Make a Bull's Eye

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

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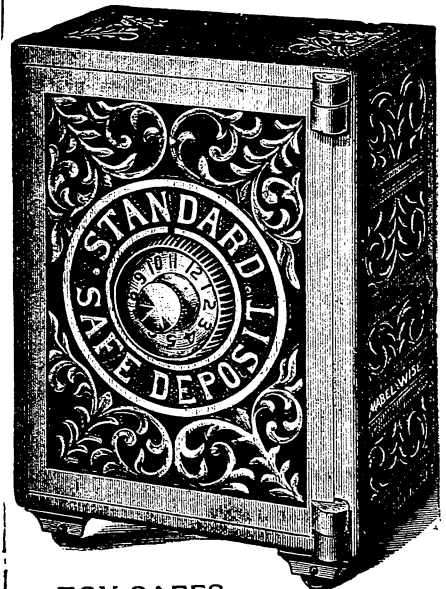
Please mention *The Iron Age* when you write.

The HENRY C. HART MFG. CO.,

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MANUFACTURERS OF

Hardware Specialties.



TOY SAFES.

THE QUEEN ANNE SCREEN CO.,

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MANUFACTURERS OF

Improved Adjustable Window Screens.
THE QUEEN ANNE, with box panels; the only screen made and finished alike on both sides.
THE EUREKA. The best cheap extension screen on the market.
SCREEN DOORS. Finished all ready to hang Sticks, Corners, Improved Frames, &c.
Write for circular and Price-list.

A. S. HENN & CO.,

Manufacturers of

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NEW HAVEN, CONN.



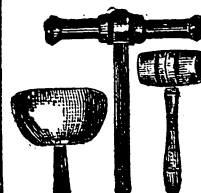
N. Y. MALLET AND HANDLE WORKS.

MANUFACTURERS OF

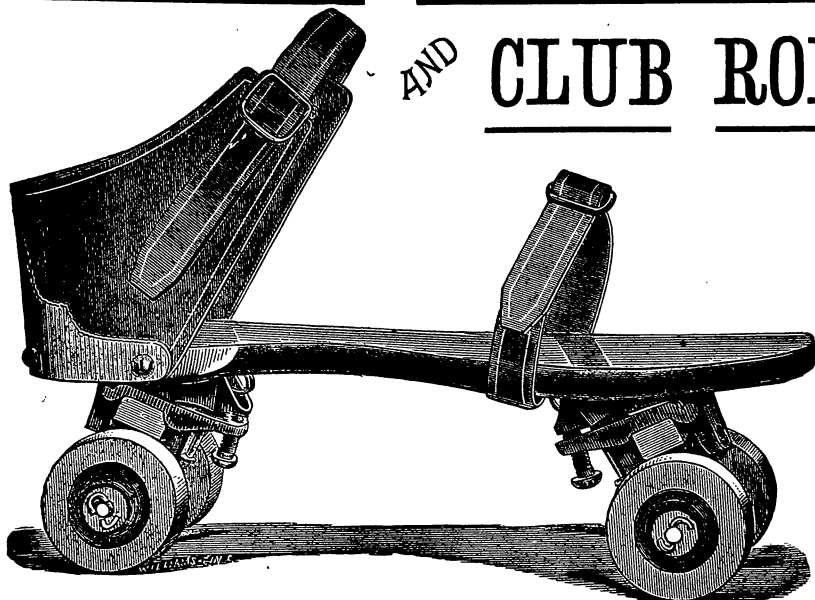
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Also Cotton and Bale Hooks.

Patented Feb. 13, 1877, a new combination of Hooks.
456 E. HOUSTON ST.,
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HENLEY'S CELEBRATED RINK AND CLUB ROLLER SKATES.



A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page catalogue and prices,

M. C. Henley,

RICHMOND, IND.

Suppose They Haven't;



What the blazes do you want with drummers anyway Nuisance! Nuisance! They're good fellows, to be sure. I like them, but they take up half my time. No, I'll tell you; you write on to the O. L. Co., get a small sample order of their goods right away, right through the line. You'll be surprised at the prices, quality considered. Now, that's a fact, and you'll make money by it.

Ohio Lantern Co.,
TIFFIN, OHIO.

W. W. PRYOR & CO., - Eastern Agents.

A full line of samples can be seen and the trade supplied at factory prices.



SURPRISE TUBULAR.

This GUN has rebounding locks and the barrels can be taken off and put on again without cocking the arm, and when cocked the hammers may be let down gradually, and without the full force of the blow. It is simple in construction, having very many less pieces than any other hammerless gun.

Easily Tipped and Cocked,
Damascus Barrels,
Handsomely Engraved,
French Walnut Stock.

SEND FOR DESCRIPTIVE
CATALOGUE.



New Hammerless Double Gun,

MANUFACTURED BY

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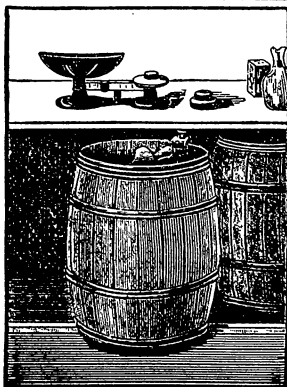
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PRICE VERY LOW.

GENUINE **MARTY** RAT AND
ALWAYS IN STOCK. MOUSE
TRAPS



THEY DO THE WORK.
Orders solicited. Prices on application.
BURDITT & WILLIAMS,
20 Dock Square, Boston, Mass.
SOLE AGENTS AND IMPORTERS.



**Wonder Somebody Didn't
THINK OF IT BEFORE!**
The Perfection Barrel Swing.

A simple device, readily attached to any Pantry, Cupboard, Broad Shelf or under the counter in a Grocery or Hardware Store, for swinging a barrel to get at the contents easily. Price, \$1. All Hardware dealers will supply them.

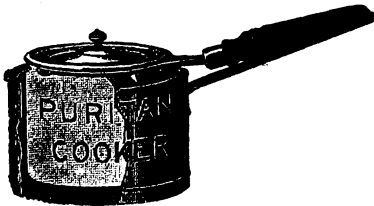
MANUFACTURED BY

THE LEAVITT MACHINE CO.

ORANGE, MASS.

"PURITAN"

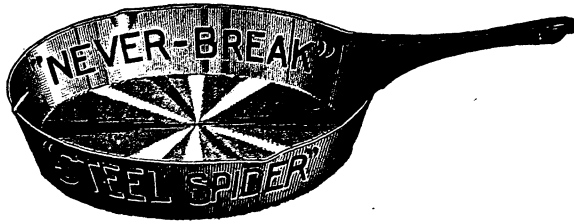
COOKERS, COFFEE POTS AND
OTHER SPECIALTIES.



Cooks Quicker than any other
Porcelain Rice Boiler made.

"NEVER-BREAK"

Wrought Steel Spiders
Wrought Steel Griddles, Kettles, Stew Pans, Stew Pots, Maslins,
Scotch Bowls, Hotel Sauce Pans, &c.
MIRROR POLISHED—TINNED—PORCELAINED.



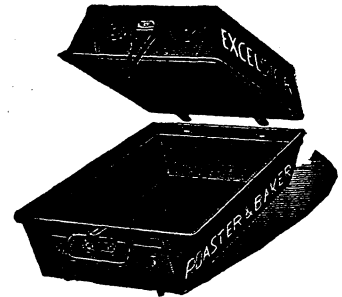
"MIRROR POLISH," the only Perfect Plain Steel Finish

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THE BRONSON SUPPLY COMPANY,
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"EXCELSIOR"

Roasting and Baking Pan.
PLANISHED and PLAIN STEEL.



No. 3

Globe Street Lamp.

Light your Streets and Driveways.

The S. G. & L. CO.

Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.
Equal to the best Gas Light.
Will not Blow Out in the Strongest Wind.
Will not Smoke.
Will not Freeze.
Automatic Extinguisher.
Outside Wick Regulator.
Will Burn Four Hours for One Cent.

MANUFACTURED BY

STEAM GAUGE AND LANTERN CO.,

SYRACUSE, N. Y.

Western Branch, 25 Lake St., Chicago, Ill.

ESTABLISHED 1840.

A WORD TO THE WISE.

When you purchase a Lantern, Street
Lamp or Driving Lamp, remember the

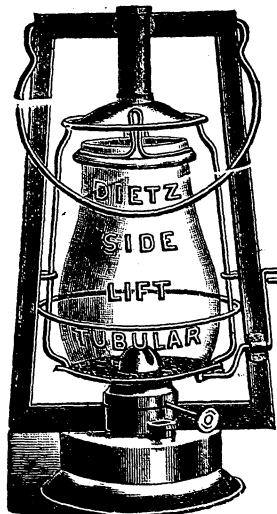
"DIETZ" Make

is the best. Our goods have stood the test of time
and are safe and reliable. The name "DIETZ" is
plainly stamped on them. Our specialty is **Tubular
Lanterns, Street Lamps and Driving Lamps.**
We make a large variety, being the oldest and largest
house in our line.

ASK FOR THEM!

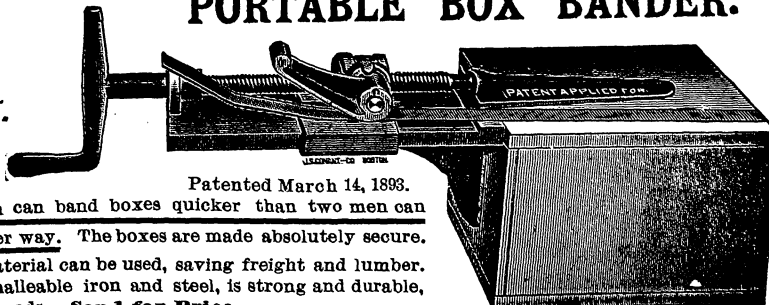
R. E. DIETZ COMPANY,

New York, 60 Laight St. U. S. A. Chicago, 25 Lake St.



SOON
PAYS
FOR
ITSELF.

PORTABLE BOX BANDER.



Patented March 14, 1893.

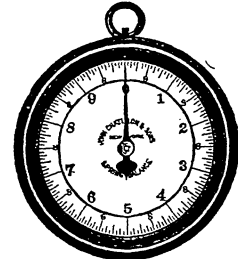
One man can band boxes quicker than two men can
in any other way. The boxes are made absolutely secure.
Lighter material can be used, saving freight and lumber.
Made of malleable iron and steel, is strong and durable,
weighs 8 pounds. Send for Price.

J. W. GOODELL, Manufacturer,

BURLINGTON, VT.

John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST., NEW YORK.



ESTABLISHED
1835.

SEND FOR
PRICE LIST.



MANUFACTURERS
OF
SCALES
—AND—
BUTCHER TOOLS.

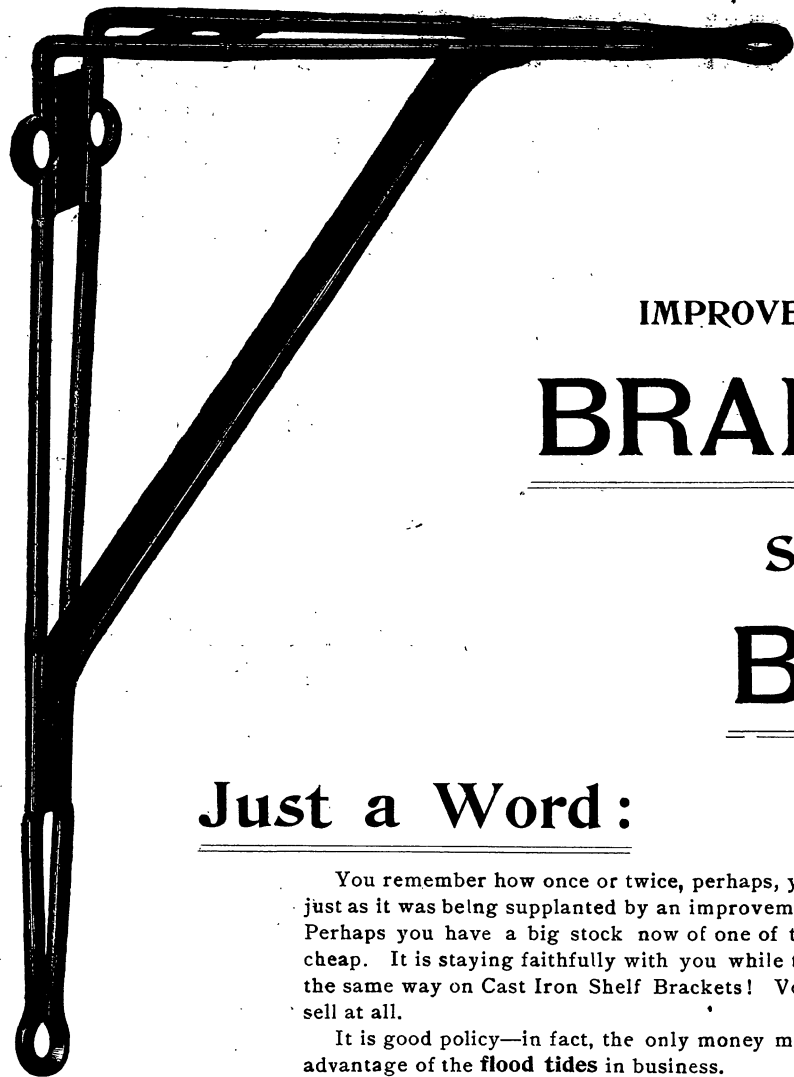
Sole Agents for

Foster Bro.'s Butchers' Cutlery.



John Chatillon & Sons, N. Y.





Pat. April 15, 1892.
Nov. 8, 1892.

IMPROVED FORM **BRADLEY**

Steel Shelf **BRACKET.**

Just a Word:

You remember how once or twice, perhaps, you bought in a large stock of something just as it was being supplanted by an improvement, only you didn't know it at the time. Perhaps you have a big stock now of one of these very things, bought because it was cheap. It is staying faithfully with you while the new article sells. **DON'T** get left in the same way on Cast Iron Shelf Brackets! Very soon these will drag, then they won't sell at all.

It is good policy—in fact, the only money making policy of the present day—to take advantage of the **flood tides** in business.

The **BRADLEY STEEL BRACKET** has come to stay. **50,000 Dozen** sold the first year!

It is growing in popularity every day. Your true course is to take it up **to push** this Fall. Work the old style off where you can, but **be identified with the new**; be in the swim and abreast of the times.

Here are the Reasons:

The **BRADLEY STEEL BRACKET** is **not brittle**; it **will not break**; can be put up with nail and hammer. The position of the screw holes is the most convenient possible.

IT DOESN'T LOOK IT, but it is much stronger than cast iron—**will hold up fully 20 per cent. more weight.**

IN APPEARANCE it is far superior—the design is artistic; the proportions are correct, the finish the best.

IT IS THE LIGHTEST BRACKET on the market—the saving in freight is large—a consideration also appreciated by the builder. Cast iron brackets in quantity are heavy.

DROP US A CARD WHILE YOU THINK OF IT, AND LET US QUOTE YOU PRICE.

ATLAS MFG. CO., New Haven, Conn.

New York Office, 90 Chambers St.,
W. H. JACOBUS,

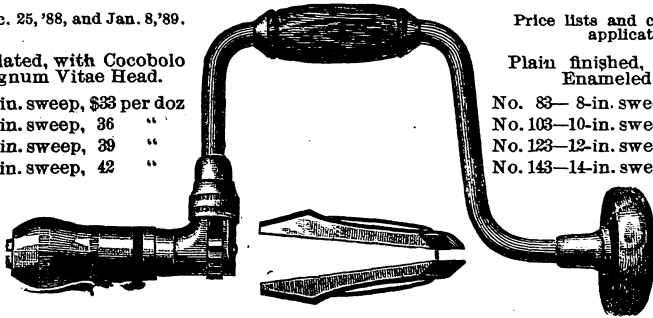
General Representative,
C. M. AVERY.

**FRAY'S RATCHET BRACE.**

Patented Dec. 25, '88, and Jan. 8, '89.

Nickel-Plated, with Cocobolo handle, Lignum Vitae Head.

No. 81—8-in. sweep, \$33 per doz
 No. 101—10-in. sweep, 36 "
 No. 121—12-in. sweep, 39 "
 No. 141—14-in. sweep, 42 "



Price lists and catalogues on application.

Plain finished, with Black Enamelled Head.

No. 83—8-in. sweep, \$18 per doz
 No. 103—10-in. sweep, 19 "
 No. 123—12-in. sweep, 21 "
 No. 143—14-in. sweep, 23 "

JOHN S. FRAY & CO., - Bridgeport, Conn., U. S. A.



THE TRADE acknowledges our make of **BUTCHERS' STEELS**
THE BEST IN THE WORLD.

FOR CATALOGUES AND PRICE-LISTS ADDRESS

C. & A. HOFFMAN, Manufacturers, FRANKFORD, PHILA., PA.**THIS IS THE "OLD RELIABLE" DOUBLE ACTION RATCHET SCREW DRIVER.**

One of the very Best Tools Ever Invented.

It Combines Greater Strength, Convenience and Durability than was ever obtained in a Common Driver

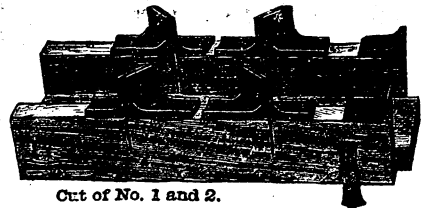
Gives Perfect Satisfaction. Sells Readily.



LEADS THEM ALL.

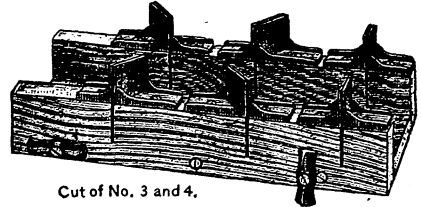
Sold by all First-Class Dealers. Send for Price-List.

Manufactured by **CAY & PARSONS,** - Augusta, Maine, U. S. A
 JOHN H. GRAHAM & CO., Agents, 113 Chambers Street, New York.

Olmsted's Mitre Boxes

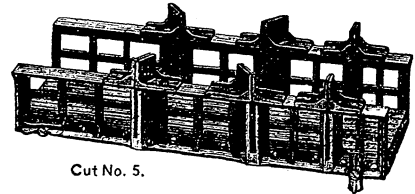
Cut of No. 1 and 2.

Price No. 1, \$12; No. 2, \$18 per dozen.



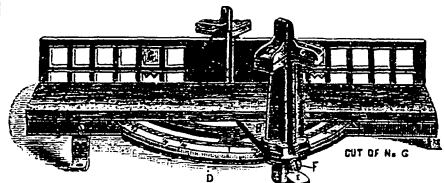
Cut of No. 3 and 4.

Price No. 3, \$15; No. 4, \$21 per dozen.



Cut No. 5.

Price No. 5, \$45 per dozen.



Price No. 6, \$60 per dozen.

Nos. 1, 2, 3 and 4 have hardwood frames and iron saw guides. No. 5 has iron frame and saw guides. No. 6 is a Universal Mitre Box made of iron and steel. For descriptive circular and discounts address

L. H. OLMSTED, Hasbrouck Heights, N. J.

BUSINESS ESTABLISHED 1798.

INCORPORATED 1891.

JOS. F. McCOY CO.,

26 Warren St., New York,

—Importers and Dealers in—

HARDWARE, CUTLERY, TOOLS

—AND—

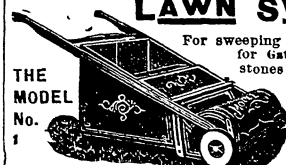
RAILWAY SPECIALTIES.

Headquarters for

POCKET CUTLERY, SCISSORS and TOOLS.	Monarch Cutlery Co. Irving Cutlery Co.
RAZORS, TABLE CUTLERY.	George Butler & Co.
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HYDRAULIC JACKS, BLOCKS and HOISTS.	Tangyes, Limited.
PATENT DIFFERENTIAL PULLEY BLOCKS.	Wm. Eades & Co.
RATCHET DRILLS.	Weston's Patent.
BRASS WIRE CLOTH.	Weiller & Co.

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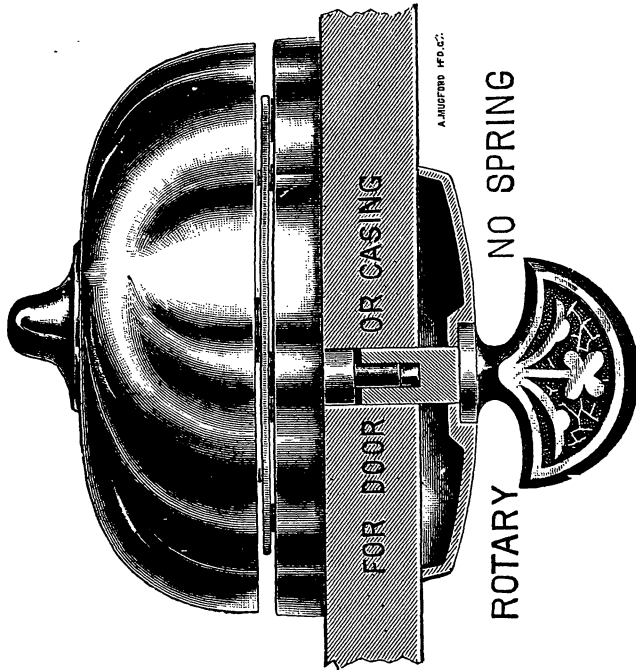
For sweeping Lawns after mowing, for Gathering Leaves, sticks, stones and litter. Used in Parks, Cemeteries, Tennis Courts and all public and private grounds. Two sizes. **LAWN ROLLERS.** For keeping lawns and terraces smooth and compact. Used when frost is leaving ground and after rain for re-sodding and laying out yards and flower gardens. Write for full description and prices. **THOMPSON & CO. D. N. WEAVER, Sec'y. ELKHART, INDIANA.**



THE MODEL No. 1

NEW DEPARTURE "ROTARY" DOOR BELLS. ELECTRICAL RESULTS.

(PATENTED JULY 14, 1891; MARCH 29, 1892.)



Simply turning the knob about ONE-FOURTH IN EITHER DIRECTION produces about TEN CLEAR, FULL tones, which, though not startling or annoying, can be better heard all through the house than any bell ever made to imitate Electrical Results.

3 INCH.

No. 91, - - - - - Nickel Plated.

No. 92, - - - - - Bronze Plated.

PER DOZEN, \$20.00

3 1-2 INCH.

No. 101, - - - - - Nickel Plated.

No. 102, - - - - - Bronze Plated.

PER DOZEN, \$24.00.

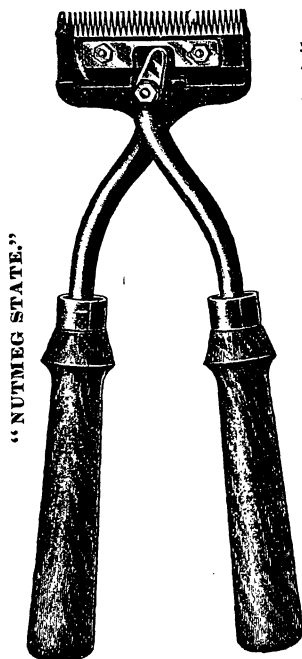
No. 101 and 102.

LIBERAL DISCOUNT TO THE TRADE.

JOHN H. GRAHAM & CO., 113 CHAMBERS ST., NEW YORK CITY.

GENERAL AGENTS.

Edward S. Hotchkiss,
MANUFACTURER OF HARDWARE,
BRIDGEPORT, CONN.



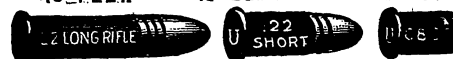
SATISFACTORY PRICES. Standard goods. Don't fail to write when in want of Horse and Barber's Clippers, No. 20 Steel Rat Killers, Curry Combs, Metal and Wood Choker Mouse Traps Lemon Squeezers, Baxter Pattern Wrenches, &c., &c.

AMERICAN TOOL COMPANY,
NEW YORK,
MANUFACTURERS OF
TOOL CHESTS

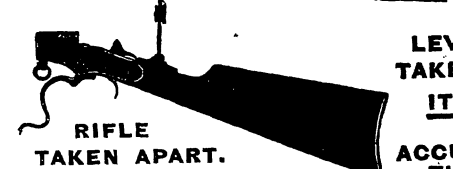
Of all sizes, complete with tools, for Hardware, Toy, Notion and Variety trades.
Factory and Salesroom,

200 West Houston Street, near Varick.
Also Machinists' Tool Chests, empty. Illustrated Catalogue and prices furnished on application.

A Triumph in Small Bore Rifles. STEVENS' "FAVORITE" RIFLE.



Made for the 22 or 25 Rim Fire Cartridge.



RIFLE
TAKEN APART.

WEIGHT, 4½ POUNDS.
22-INCH BARREL.
LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.
**IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.**

No. 17. Plain Open Sights.....\$12.50
No. 18. Vernier, Open Back, and Beach Front Sights..... 17.00
No. 19. Lyman Peep, Open Back, and Lyman Front Sights, 17.00

A 60 Page Catalog showing our full line of Fire Arms with TRADE PRICE LIST, sent with pleasure to all dealers.

J. Stevens Arms & Tool Co.,

P. O. Box 5729.

Chicopee Falls, Mass. U. S. A.

ENTERPRISE LAWN SPRINKLER.

No. 1, \$3.50; No. 2, \$2.75.

Indispensable
to a well kept
Lawn.

A Sprinkler
which will work
satisfactorily in
spite of muddy
water.

May be easily
moved from
place to place
without going
near it

SOLD BY ALL
HARDWARE DEALERS.

SEND FOR CATALOGUE.

THE ENTERPRISE MFG. CO., of PA., 3d and Dauphin Sts., Philadelphia.

Branch Office, with J. C. McParty & Co., 97 Chambers Street, N. Y.

**ADVANTAGES:**

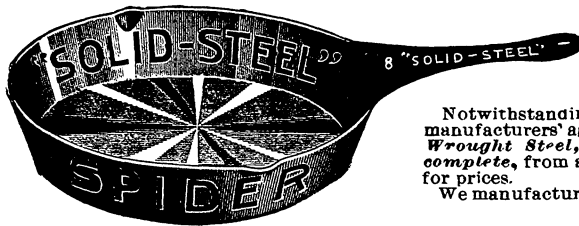
1st. Each machine is furnished with a cord or rope, so that the Sprinkler may be easily moved, when running, without going near it.

2d. The water passes through a strainer before it enters the small perforations, which are thereby prevented from filling up.

3d. It is so constructed that the weight of its revolving parts is removed by the pressure of the water, thus overcoming unnecessary wear.

4th. All parts of the machine are made sufficiently strong for ordinarily rough usage and are interchangeable.

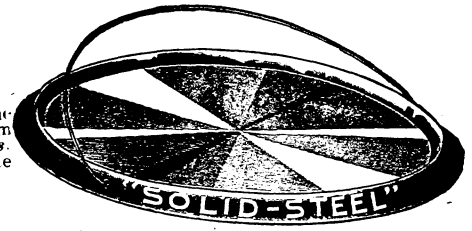
5th. The machine is TINNED and NICKEL PLATED and is of very handsome appearance.

"SOLID-STEEL" SEAMLESS HOLLOW WARE.

No Seams, no Rivets in "Solid-Steel" Ware.

BRILLIANT FINISH.

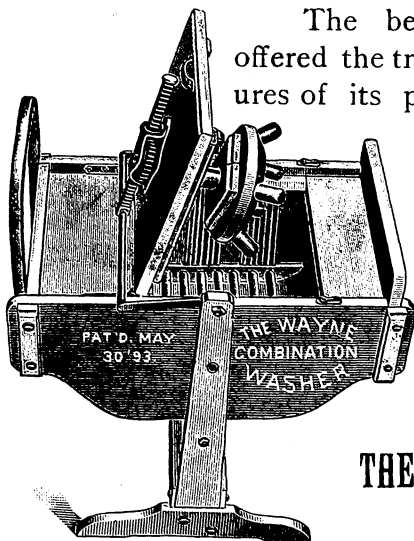
Notwithstanding the claims made by some manufacturers' agents, our spiders are made from *Wrought Steel, Without Seams or Rivets, complete, from a single piece of metal.* Write for prices.
We manufacture our own goods.



Made either with Balls or Solid Handles.

The Cleveland Stamping & Tool Co., Cleveland, O.

We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.

A NEW ONE.

The best, the onliest combination ever offered the trade. Embodies all the good features of its predecessors and many others peculiar to itself.

It's a Washer

That can't be beat.

SEND FOR SAMPLE.

**THE ANTHONY WAYNE MFG. CO.,
FORT WAYNE, IND.**

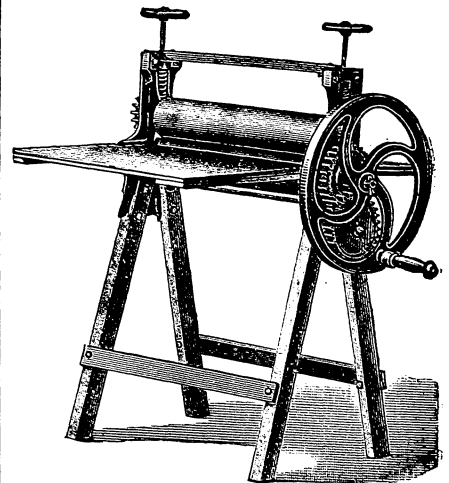
The Family Mangle.

WARRANTED TO DO

Better Work than Hand-work.

SAVES all the fuel,
two-thirds the work.
Keeps the linen whiter.

We Guarantee Every Machine.



Send for descriptive circular to

S. C. Johnson, Racine, Wis.

Agents Wanted.

**JACKETED KETTLES
HOLLOWWARE.**

**THE STUART & PETERSON CO.,
Philadelphia, Pa., and Burlington, N. J.**

WARREN AXE AND TOOL WORKS, WARREN, PA., U. S. A.,

Manufacturers of a Superior Quality of

AXES AND TOOLS,

Including Double and Single Bit Axes, Broad Axes, Hand Axes, Planing Mill Knives, Moulding Knives, Machine Knives of all kinds, Carpenter Adze, Mining Picks and Bark Spuds.

We make **THE SAGER SPECIAL CHEMICAL PROCESS AXE**, only known by us, while others are imitating this axe. None genuine without our label: **SAGER'S SPECIAL CHEMICAL PROCESS AXE.** Write for Prices.

The Sun Manufacturing Co.,

Successors to the Jno. M. Waddel Mfg. Co.,

ARE SOLE OWNERS AND MANUFACTURERS OF

**Waddel's Improved Coffee Mills,
Cathedral Gong Money Drawer and Surprise Rat Traps.**
Beware of Infringements.—We will protect our Patents.

"THE 'SUN' ONLY, SHINES FOR ALL."

A New Name, A New Reputation,

A New Line of Coffee Mills

That under the SUN Brand shine as leaders.

RAPID GRINDERS that will STAND THE WEAR.

STEEL ALLOY BUHRS,

A metal of recent discovery for this purpose used solely and only by the SUN. Warranted to outwear, outgrind and outsell any Coffee Mill ever put on the market.

We Challenge a Competing Test for Rapid Grinding and Wearing Surface.

Our New Line bears the Sun Trade Mark and is labeled Steel Alloy Buhrs.

Write for Our Catalogue and New Prices

Order a Sample Mill.

THE SUN MANUFACTURING CO.,

Greenfield, Ohio, U. S. A.,

MANUFACTURERS OF

Cash Registers, Money Drawers, Coffee Mills and Wooden Ware Specialties.



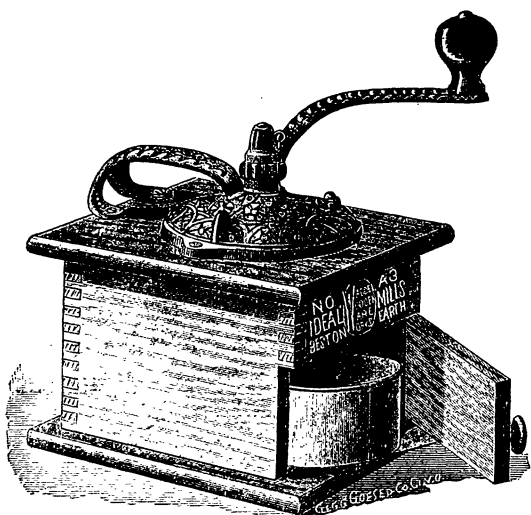
Make No Mistake

When you want a "NEFF" Washer buy it.

When you think you want some other make examine Neff's first and if you don't think it's the best, we'll give it to you. But if you want to do business write for prices, that's the best way: saves money and time.

W. H. NEFF, - - COWAN, IND.

"BIG W. W. W. W. FOUR."



A certain company are claiming to be "sole manufacturers of Waddel's Coffee Mills," ("If you see it in the sun its so"). The statement is designed to mislead the trade. The old line of Waddel's Coffee Mills, which have been on the market the past five years, are not manufactured by us. We are making a new line of Coffee Mills which are guaranteed to grind twice as fast as similar goods, and each mill is labeled under a trade-mark "Ideal Coffee Mills manufactured by Waddel Woodenware Works; best on earth." Specify the new goods and order "Ideal Mills," and our word for it, you will not make a mistake. Address plainly

Waddel Wooden Ware Works or "4 W.,"

Greenfield, Ohio.

MANUFACTURERS OF

CASH REGISTERS, MONEY DRAWERS, COFFEE MILLS, RAT TRAPS and NOVELTIES.

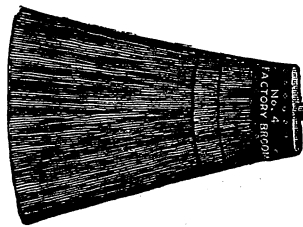
The Original Hunter Sifters



Are made unlike any other, and of course are superior to any others. They can be imitated to be sure, but then—oh! well, what's the use of talking, you are not getting what you pay for.

—ADDRESS—

The FRED J. MEYERS MFG. CO.,
COVINGTON, KY.



No. 4 FACTORY CORN BROOM.

Designed for light work in Woolen, Cotton, Knitting, Cloth and Yarn Mills, and for purposes where a light, strong, cheap and good

**JOS. LAY
& CO.,**

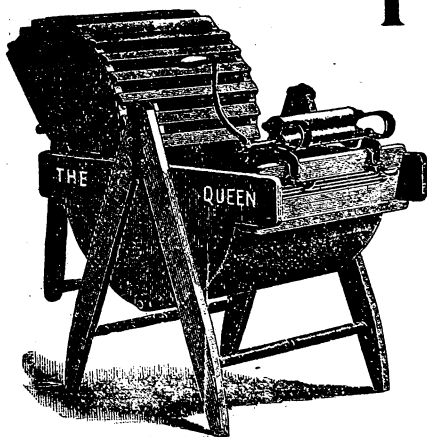
RIDGEVILLE, IND.

sweeping broom is required. It has been thoroughly tested in the above mentioned establishments, and has proven to be the best ever made. Consumers should give them a trial. The increased wear they will stand will repay the investment. We also make a full line of

Brooms for other purposes, and Brushes. Write for prices.

The Queen. LEADER FLY TRAPS.

Corn Poppers and other Wire Goods.
Manufactured by

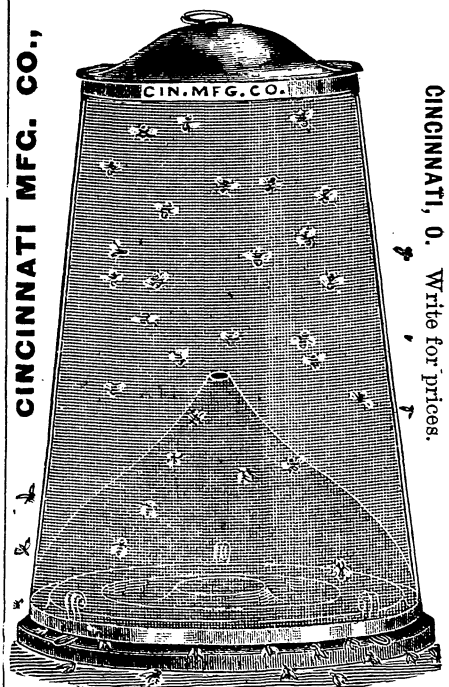


The best, cheapest, cleanest, most meritorious and practical washer ever offered and easiest to operate. Write for sample to

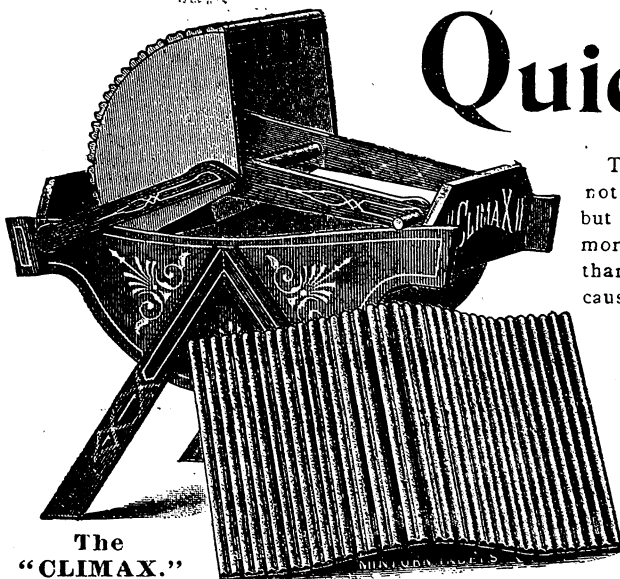
Buckeye Churn Co.,
SIDNEY, O.,

—MANUFACTURERS OF—
BUCKEYE CHURN AND WOODEN-WARE SPECIALTIES.

CINCINNATI MFG. CO.,



CINCINNATI, O. Write for prices.



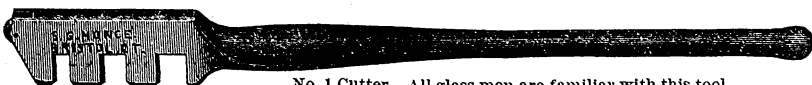
Quickest.

The "Climax" Washer is not only one of the best made but is quicker, cleaner and more practical in operation than any. Dealers buy it because they can sell it without stretching their conscience.

—THE—
STEARNS MFG. CO.,
CONNERSVILLE, IND.,
Manufacturers of
CLIMAX WASHER, CLIMAX
WOOD AND CHAIN PUMPS, ETC

The
"CLIMAX."

MONCE'S NOVELTY GLASS CUTTERS. ———INTERCHANGEABLE LOCK STENCILS.



S. G. MONCE, - - - BRISTOL, CONN.

No. 1 Cutter. All glass men are familiar with this tool.

**SHEETS,
COOKING UTENSILS,
MEDALS,**

Sheets and Rivets for Boats
and Coffins.

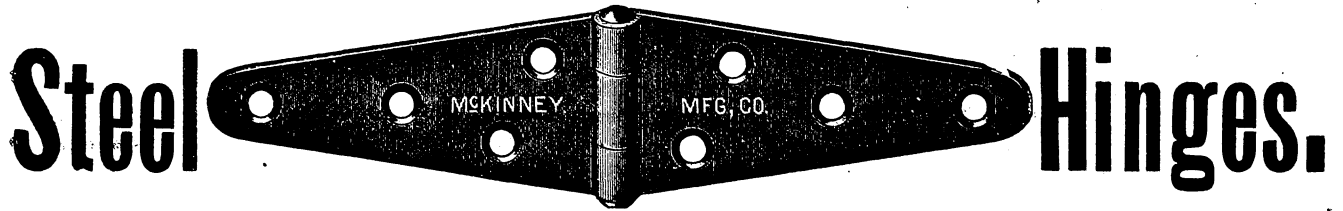
Bars for Horse Shoes.

ILLINOIS PURE ALUMINUM CO.,
LEMONT, ILLINOIS.

WE CLAIM

That one pair of our Celebrated Steel Hinges will outwear two pair of the Flimsy Invention now being forced upon the attention of the trade.

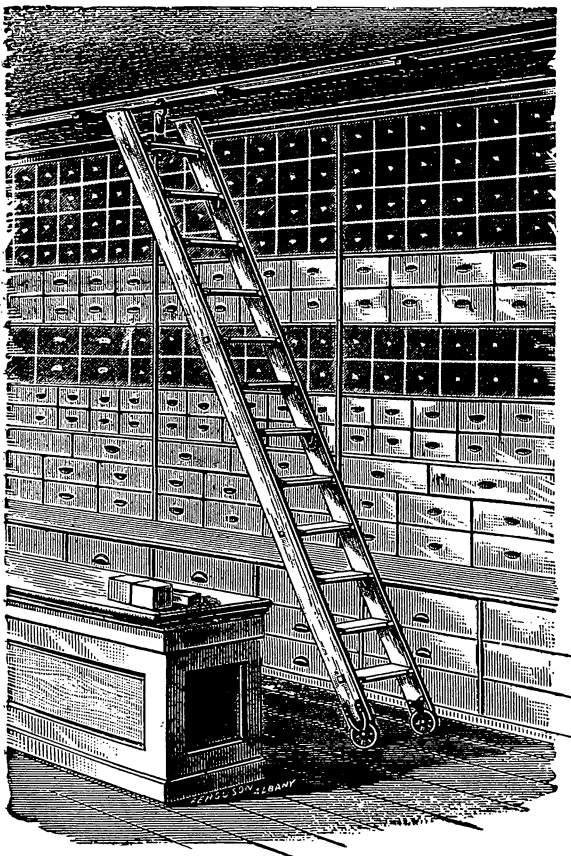
McKINNEY MFG. CO., ALLEGHENY, PA.



SEND FOR LIST.

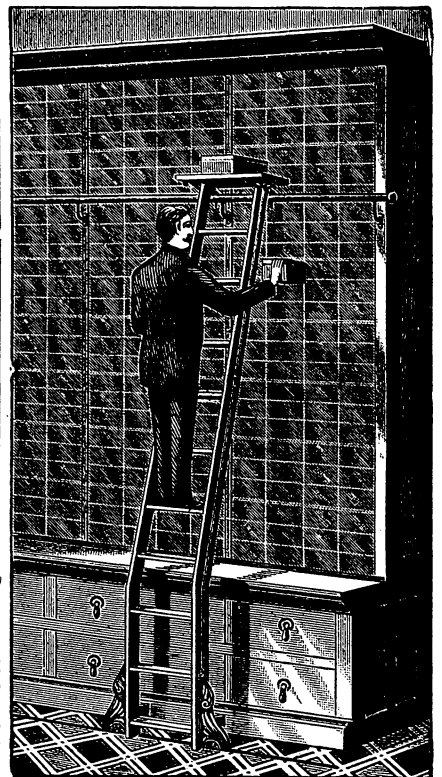
"NONE BETTER."

THE "NOISELESS" STORE LADDER.



The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by
M. CROISSANT,
ALBANY, N. Y.



FLOOR TRACK BICYCLE LADDER.

No other Ladder Service can approach the "Bicycle" in ease and convenience of operation. Compared with others they work like a bicycle beside a lumber wagon.

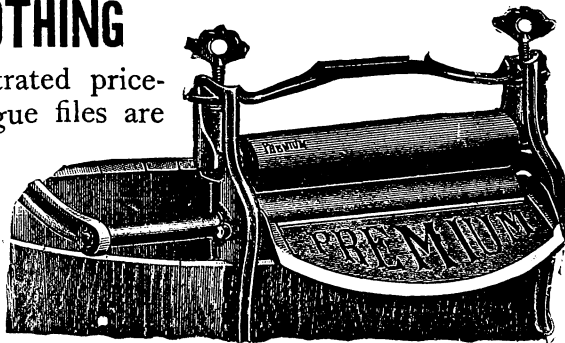
Can be applied to any kind of shelving made.

See this space next week for other styles.

Send for Illustrated Catalogue and prices to
THE BICYCLE STEP LADDER CO.,
50 State street, Chicago, Ill.

IT COSTS NOTHING

to send for our illustrated price-list, and your catalogue files are incomplete without it. Write to the Factory, Montpelier, Vt., or to our Chicago store, 68 Lake St.



COLBY WRINGER COMPANY.

BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS,** Publisher and Bookseller, 96-102 Reade Street, New York.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

MANUFACTURED ONLY BY

"THOMAS MORTON,"

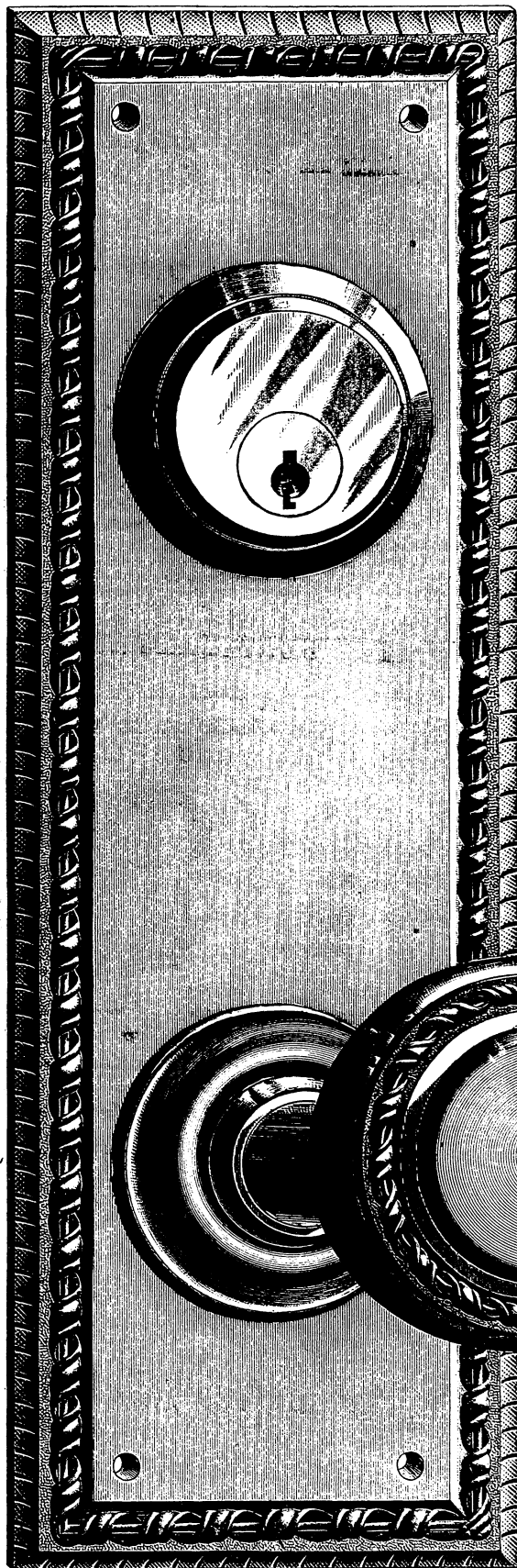
65 Elizabeth Street,

Write for Prices.

NEW YORK.

SAFEST AND BEST.

"VASSAR" LOCKS

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Art -:- -:-
-:- Hardware.

Complete Lines of

FINE

HOUSE TRIMMINGS,

In a Large Variety of

Ornamental
Designs

—AND—

PLAIN PATTERNS,

—IN—

Solid Bronze Metal,
Wrought Bronze

—AND—

Rust Proof Iron.

"VASSAR"**RIM NIGHT LATCHES.****RIM DEAD LOCKS.**

With Patent Self-Adjusting Connect-
ing Spindle.

—) MANUFACTURED BY (—

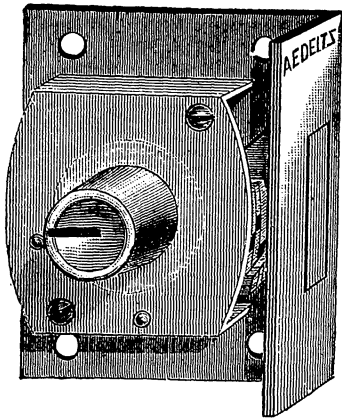
READING HARDWARE CO., Reading, Pa.

NEW YORK.

PHILADELPHIA.

CHICAGO.

A. E. DEITZ THE SMITH & EGGE MFG. CO., BRIDGEPORT, CONN.



No. 51 Lock.

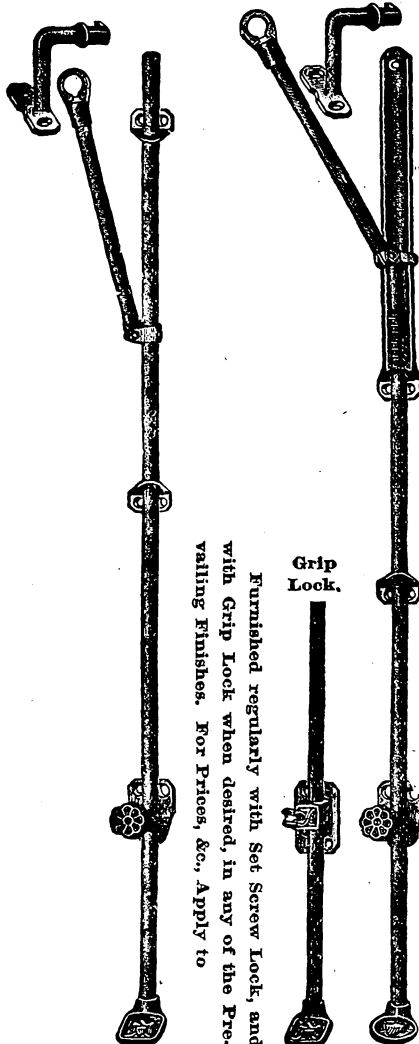
J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts., New York.

Factory, BROOKLYN, E. D., N. Y.

TRANSOMLIFTERS

"EAGLE."

"SHIELD."



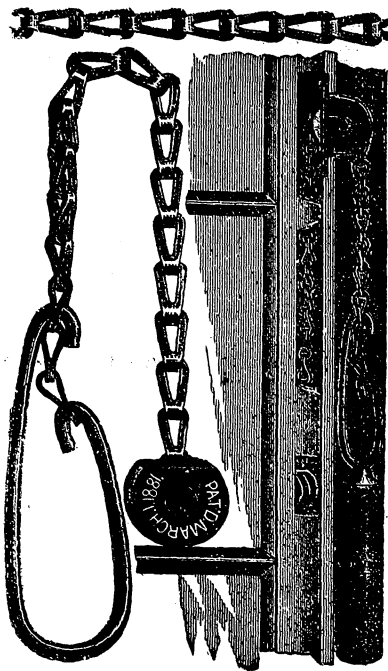
Furnished regularly with Set Screw Lock, and with Grip Lock when desired, in any of the prevailing finishes. For Prices, &c., Apply to

Grip Lock.

J. F. WOLLENSAK, PATENTEE
CHICAGO, ILLINOIS.

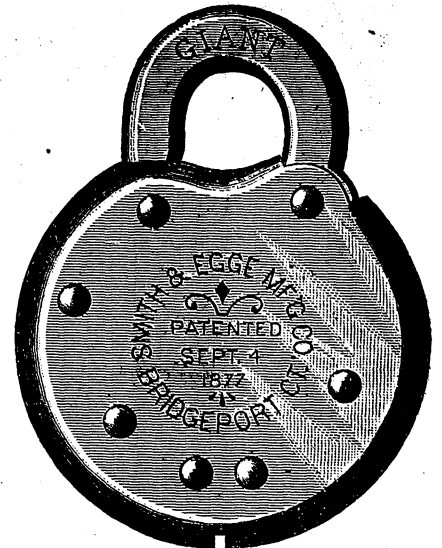
Magical Experiments; or, Science in Play.
By ARTHUR GOOD. Translated by CAMDEN CURWEN and ROSE WATERS. The experiments explained include some designed merely for recreation, with many really scientific in character. These latter are given with a view of stimulating an interest in the study of physics. 320 pages, illustrated, 8vo, cloth. \$2.00.

For sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.



THE GIANT METAL SASH CHAIN

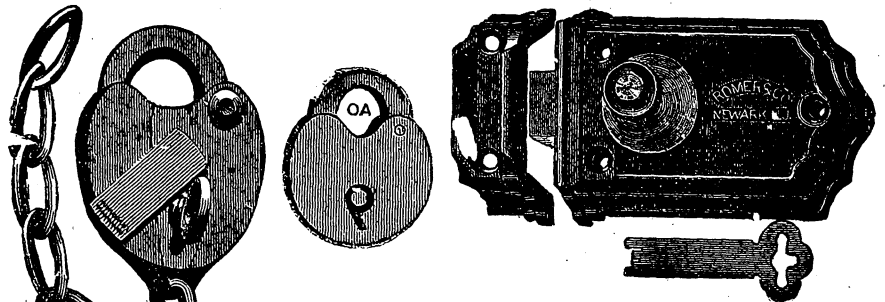
is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."



THE GIANT PADLOCK.

Centennial Award "Superior in Every Respect." This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

ROMER & COMPANY, Manufacturers of PATENT JAIL LOCKS, BRASS and IRON PADLOCKS,



Adjustable Door Knobs and Trimmings,
Front Door Handles.

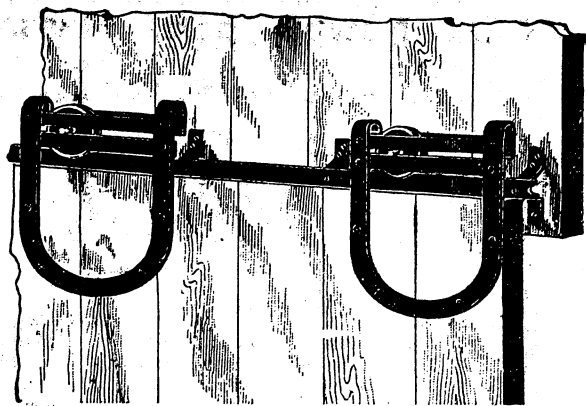
Patent Horizontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.

275, 277 and 279 Passaic St., near Erie and D. L. & W. R. R. Depots, Newark, N. J.



WATERPROOFED through SOLID. Light, CLEANLY, Handsome, DURABLE. Cheap as a GOOD ARTICLE can be made. ORNAMENTAL as well as USEFUL. Sold DIRECT TO THE TRADE. In this ARTISTIC age no dealer can afford to be without DECORATED FLAX FIBER WARE, bearing above trademark and made only by above Company.



Lane's Patent Steel Barn Door Hangers,

"O. N. T." Track for same.

The first Anti-friction Steel Door Hanger placed upon the market and to-day stands as the original and best. Sold in all the States of the Union, as well as abroad. Also Lane's Noiseless Steel Parlor Door Hanger, using Single Steel Track, a great success.

Lane's Pat. Self-measuring Faucet, measuring liquids as drawn. Swift's Coffee Mills in great variety.

Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., NEW YORK.

He had in his possession 55 skeleton keys which the police claim would open any door.
—Chicago Tribune.

You are selling that kind of a lock every day and your customers think you are selling the best the market affords.

ARE YOU SELLING the best the market affords?

The Craig Locks are guaranteed Sneak Thief Proof.

Send for Catalogue.

KEYLESS LOCK CO., I. A. 197 So. Canal St., Chicago, Ill.

PATENT PERFECTION PADLOCK

Eight Tumblers. Key Turning Both Ways.

Sizes; $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches; of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{4}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

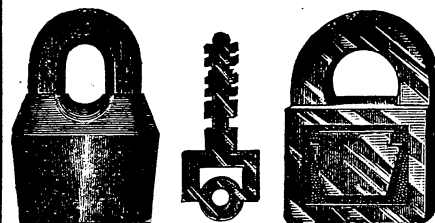
Send for Price Lists and Circulars.

KEYSTONE LOCK WORKS,

Established 1879.

E. T. FRAM, Lancaster, Pa., U. S. A.

MANUFACTURER OF



Patent Inter-Locking Tumbler Scandinavian or Jail **PADLOCKS**, in 56 grades and sizes. Key and Self-Locking. Brass, Bronze, Steel and Malleable Iron. Red, Black, Bower-Barff and Bright Brown finish. Also a full line of fine flat padlocks in Bronze and Steel. All fully described and illustrated in our new catalogue, furnished free to the trade.

SURPLESS, DUNN & ALDER,

General Agents,

97 Chambers St., New York.

Merit Always Wins.

THE CALDWELL SASH BALANCE

Has been the standard for five years.

Write for our new catalogue of Hardware Specialties.

CALDWELL MFG. CO., Rochester, N. Y.

READING HARDWARE CO., Agents.

81 Reade St., New York.

514 Commerce St., Philadelphia.

73 Wabash Ave., Chicago.

DO YOU WANT NON-PICKABLE LOCKS ?

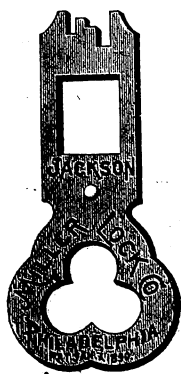
For some extra severe service? For some place where they will be used many times daily by different persons? Would you like a higher degree of security than you get from any other lock you ever tried?

The "Jackson" Locks are recommended for just such service. Constructed upon new and original principles, they are strong, well finished and far more secure than any competitor.

We state for a fact that, so far as we know, these locks are unpickable. We make Latches, Hotel and Store Door Locks, Drawer, Cupboard, and Chest Locks, Post Office and Safe Deposit Locks, etc. Please order of your jobber.

MILLER LOCK CO., - Lock Manufacturers,

No. 4515 Tacony St., PHILADELPHIA, PA.



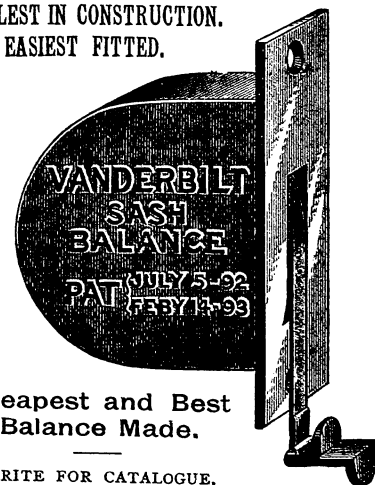
**HENRY'S
GRAPE SHEARS**

Increased demand and increased facilities for production enable us to make lower prices than ever before. Holds firmly anything it cuts and can be instantly released by the operator. Samples by mail to the trade at wholesale prices and postage.

BEST MATERIAL. WELL MADE. CHEAP.

The J. T. HENRY MFG. CO. Hamden Conn., U. S. A.

**SIMPLEST IN CONSTRUCTION.
EASIEST FITTED.**



**Cheapest and Best
Balance Made.**

WRITE FOR CATALOGUE.

**The Vanderbilt Sash Balance Co.,
CANANDAIGUA, N. Y.**

General Agents, Harmon & Dixon, 118 Chambers St., New York.

CALF WEANER "Shaw's Pat"

MADE BY

Carroll Muzzle Co.

CARROLL, IA.

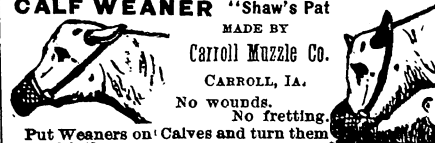
No wounds.

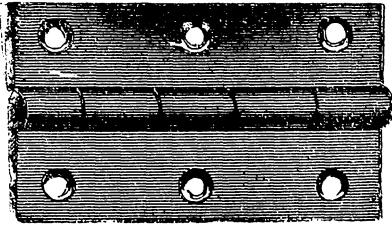
No fretting.

Put Weaners on Calves and turn them out with the cows.

"It is the only machine I ever had that worked perfectly in every way."

A. R. ANDERSON, County Supervisor.





Cast Brass Butt Hinges

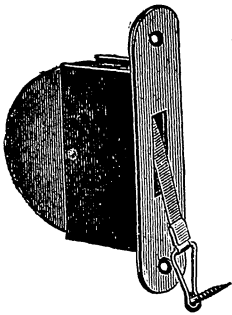
IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,
MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.**

AN ACTUAL NECESSITY
with Architects, Builders,
and Railroad Corpora-
tions.



Simple, economical,
and low in price.

By using a steel
frame our balance is
much superior to
other makes.

Can be applied to
old as well as new win-
dows.

Requires no box
frames.

Warranted 15 years.

Cord lasts 5 years.

Write for price-list.

PULLMAN SASH BALANCE CO., Rochester, N. Y.
New York Office, 142 Chambers St.
Chicago Office, 235 Lake St.

COMMON SENSE SASH BALANCE.



The Best and most Practical
substitute for weights invented.
The most Durable, the Cheap-
est and best device for all
ordinary windows. Balances
when in position are out of
sight. No rivets, bolts or
screws are used in putting it
together, so that nothing can
get out of order or need repair-
ing. No cutting, boring or
marring the sash, as the Bal-
ances are let into the jamb.

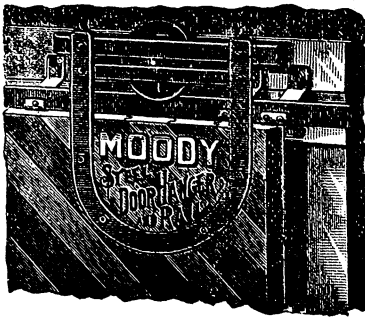
Manufacturers of Sash Balances, Sash
Locks, Sash Lifts, Monitor
Sash Irons.

STEWART & BAKER,

107 State Street, Rochester, N. Y.

THE ONLY GENUINE SOLID CASE.
ANTI-SPLITTING.
CUTS AWAY LESS FRAME.
IS HELD MORE SECURELY.
DOES NOT REQUIRE SCREWS.
HAS NO FACE PLATE.
NO CHISELING REQUIRED.
NO SPECIAL TOOLS REQUIRED.
NO COUNTERSINKING FOR
FACE PLATES. MILLIONS SOLD.
THE BEST TOO GOOD FOR YOU.
IT IS THE
EMPIRE SASH PULLEY
WITH 1/4" STEEL AXLES.
EMPIRE PORTABLE FORGE CO.
LANSINGBURGH, N. Y.

VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.



Showing one-half set of hangers attached
to door.



The Only Bracing Bracket Made.

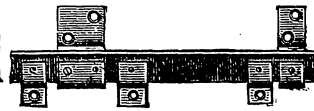
HANGERS.	PRICE-LIST.	Per Doz. prs.
No. 5, to run 6 feet, 3 1/4 in. wheel,	-	\$10.00
No. 6, to run 10 feet, 4 1/4 in. wheel,	-	15.00
No. 7, to run 15 feet, 5 1/4 in. wheel,	-	22.00
RAIL, per foot.....		8 1/2 cents



We are the original makers of steel covered hangers and all others are imitations.
Beware of infringements, as we shall protect our rights.

In our Steel Covered Hangers we have all the desirable features of the Best Hangers in the market, and with that we combine the cover for wheels SO NO ICE OR SNOW can reach the wheels, and making this cover as we do, we stiffen it so it is the strongest Hanger in the market, and we believe it is just perfect. Would be glad to have you try a small order and satisfy yourself.

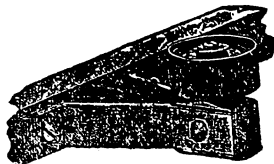
Double-Braced Steel Rail.



PATENTED JUNE 12, 1888.

This rail being double-braced and double-riveted is the strongest rail in the market. Being braced both ways it will not sag. The joint is made so it is perfectly solid. It comes complete and ready for use, requiring only screws and screw driver for any man or boy to put it up in short order. It can be used for any grooved wheel Hanger, and a heavy door will not make it spring or tremble. Guaranteed to hold a door weighing 2,000 pounds, and used in connection with our Anti-Friction Hanger will work perfectly on large or small doors.

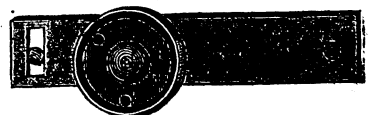
Cronk's Adjustable Stay Roller.



Made of wrought steel strap; cast block with slot
adjusted by loosening bolt.

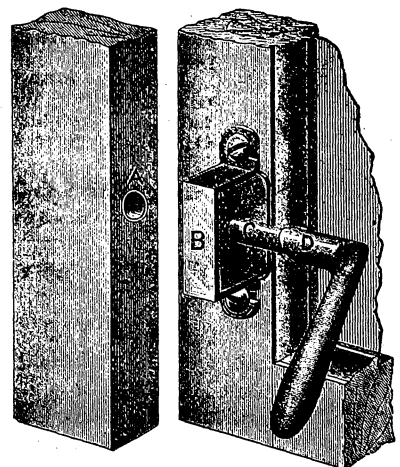
Pacific Coast Agents, CHAS. L. PIERCE & CO., San Francisco, Cal.

Cronk's Inside Adjustable Stay.



Is cheap, simple and durable, and much better than
a cleat nailed on the floor for this avoids all friction
and leaves no place for dirt to accumulate. \$2.00 per
doz. No inside door can be properly hung without
this stay.

DOLBER'S SASH FASTENER.

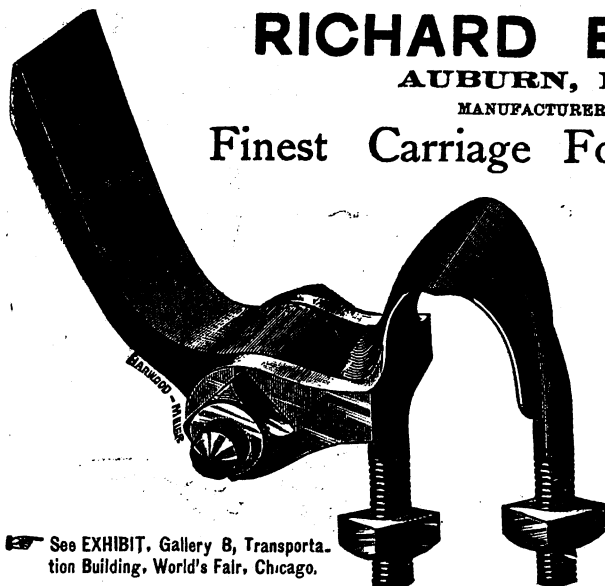


Patented August 1, 1893

The best device ever invented for fastening outside, storm or double windows, and all similar purposes.
Saves Time, Labor and Expense.

F. V. WOOSTER, Manufacturer,

66 Beverly St., BOSTON.



RICHARD ECCLES,

AUBURN, N. Y.,

MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.

See EXHIBIT, Gallery B, Transportation Building, World's Fair, Chicago.

Send for New Catalogue for Season 1893-94.



FROST'S ANTI-RATTLER

Pat. Jan. 20, 1880.

Out One-half Size.

Sample pair sent to any hardware or saddlery firm by addressing

The Frost Spring Co.,

Boston, Mass.

THE WILCOX & HOWE COMPANY,

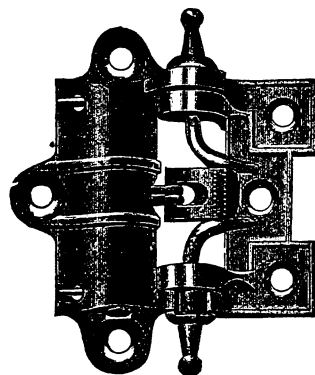
BIRMINGHAM, CONN.,

MANUFACTURERS OF

A Full Line of Carriage Hardware ALSO SPECIAL FORGINGS.

Estimates cheerfully given. Send for Catalogue

NEW IDEA SPRING HINGE



Holds the door strongest when closed.

Resistance gradually decreases in opening

and increases in closing the door.

A covered (patented) hold-back Spring Hinge. Full particulars, free Sample and Prices by mentioning this paper.

STOVER MANUFACTURING CO.,

145 River St., Freeport, Ill.

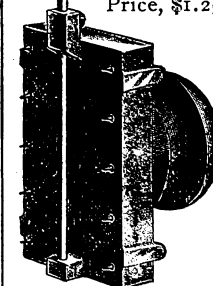
WE CLAIM

THAT

Grennan's Sash Pulley Marker

For Common Sense Pulleys is a necessity although it is claimed that each pulley is

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Saves 2 cents a window in cost of material, saves time and makes a neater and better job than tying a knot. Send for prices and circulars.

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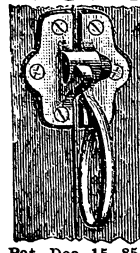
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"CONROY" Refrigerator Door Fasteners

Have rapidly supplanted all others.

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ARE BETTER IN EVERY WAY.

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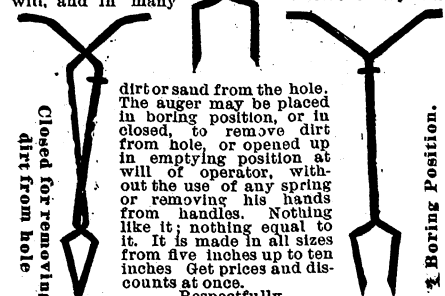
WILL PROVE SATISFACTORY TO USER.

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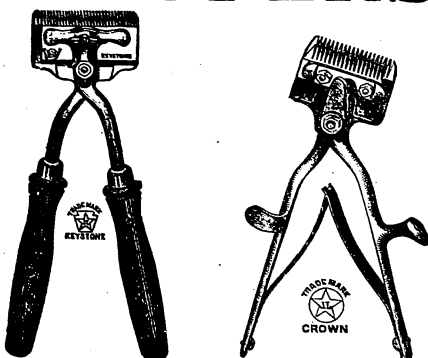
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FOR HORSEMEN OR BARBERS

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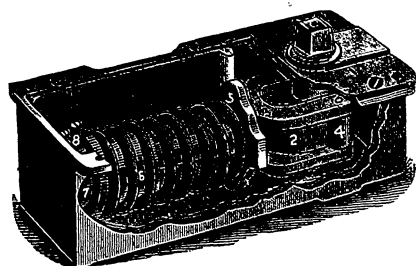
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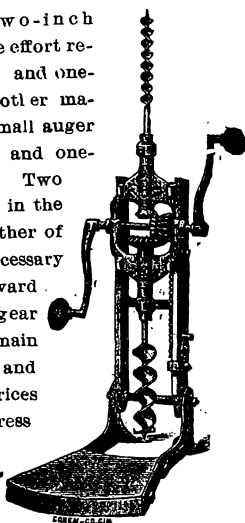
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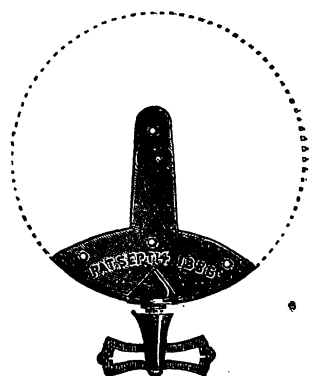
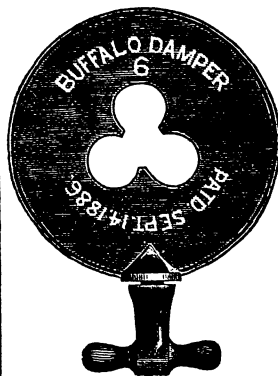
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SIMPLE,

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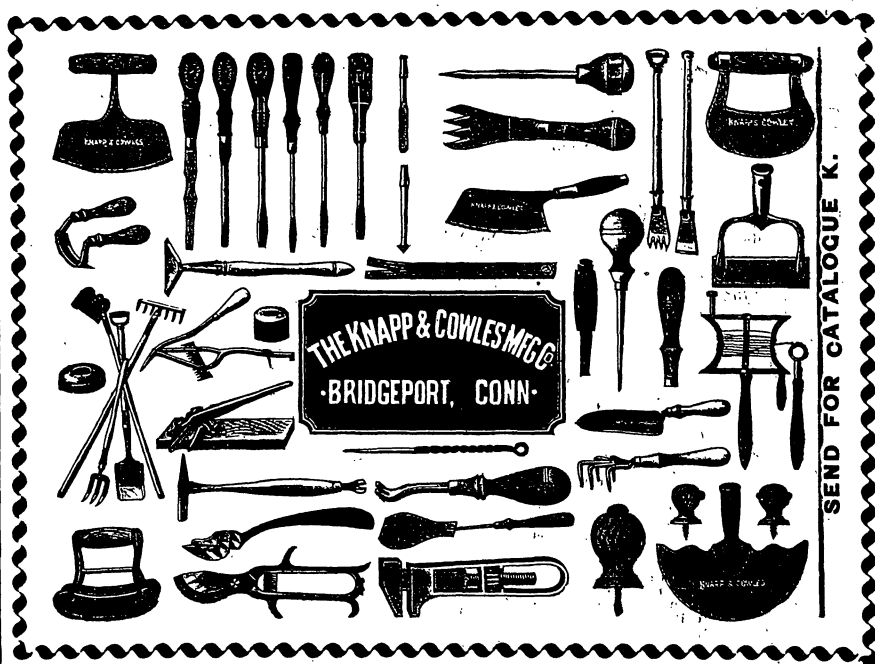
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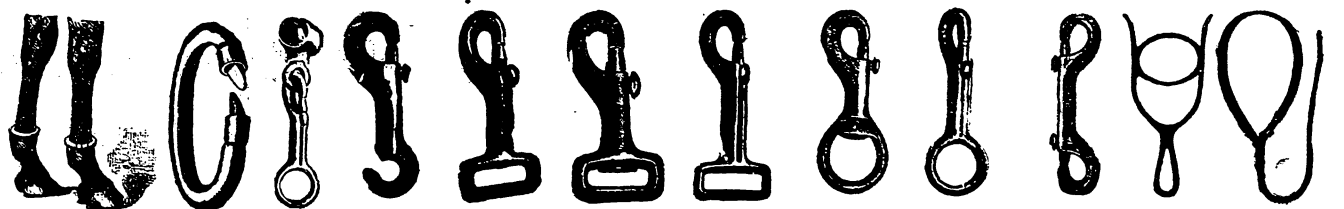
The best Steel
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Unequaled
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Cheapest in
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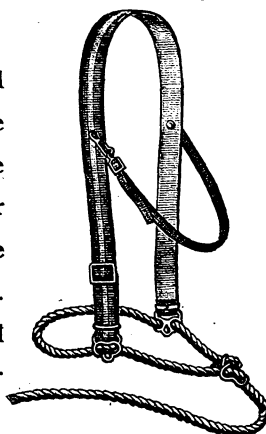


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This halter is the best and cheapest first-class adjustable halter ever placed upon the market. It is made of superior 13-cord halter web and 7-16 jute rope, and is perfectly adjustable.

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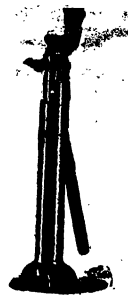
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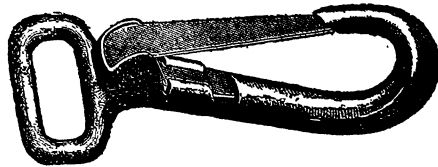
Victor. Beware of Imitations.



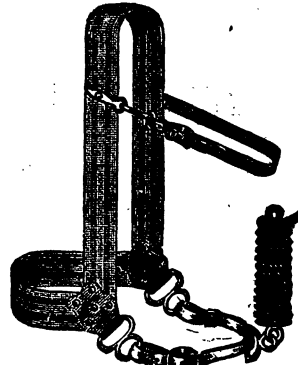
Victor is the best Iron Jack and the cheapest.



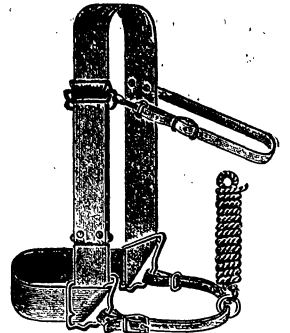
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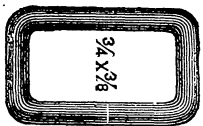
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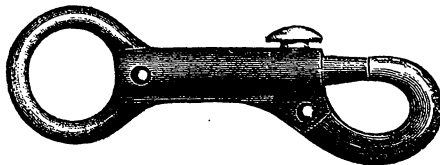
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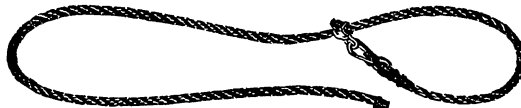
Wire Tuck Loops, made in all sizes.



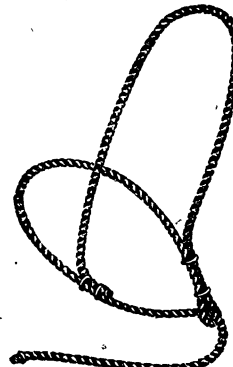
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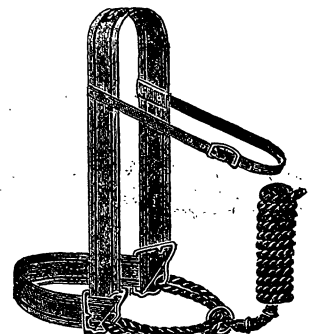
Safety Pole Tips.



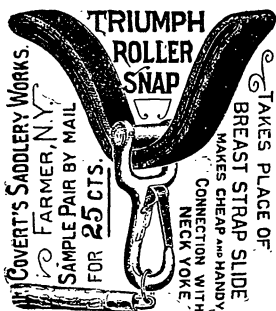
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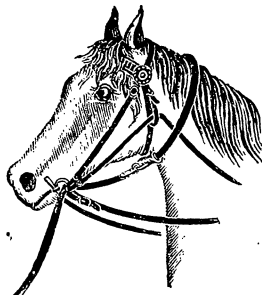
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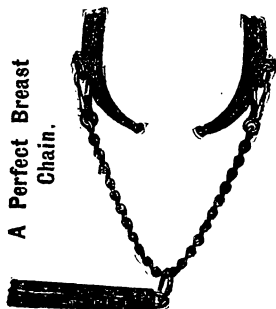
Horse Tie.



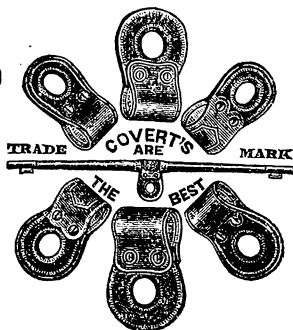
Cattle Tie.



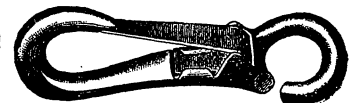
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A Perfect Breast Chain.



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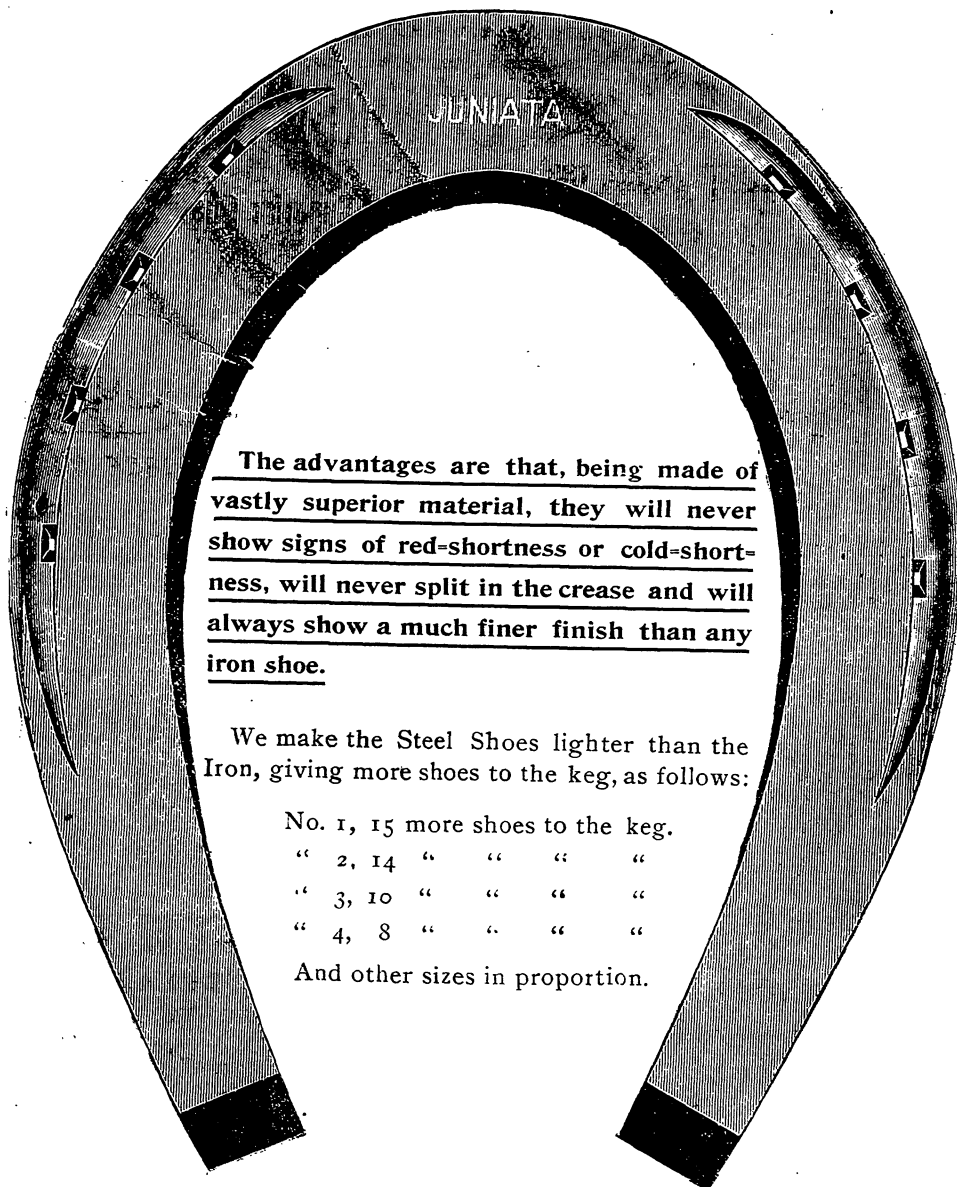
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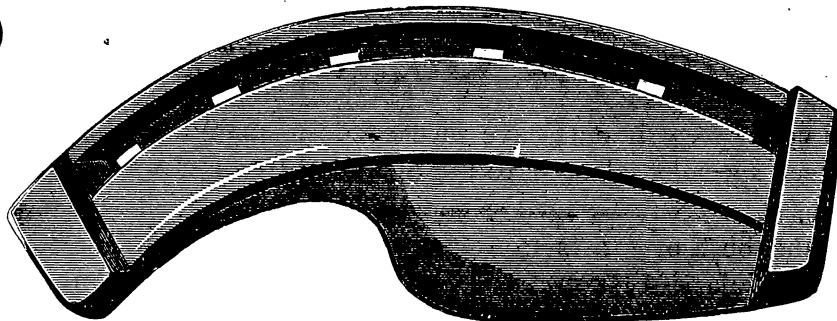
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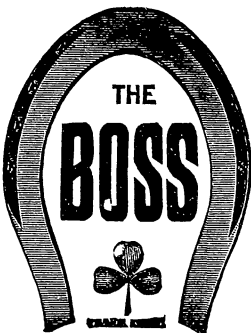
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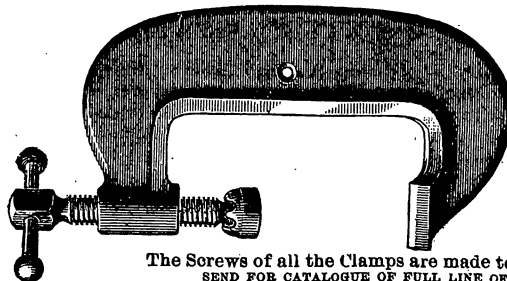
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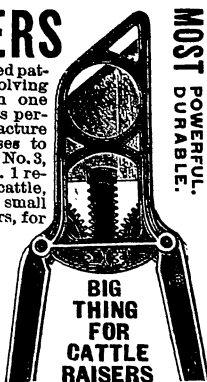
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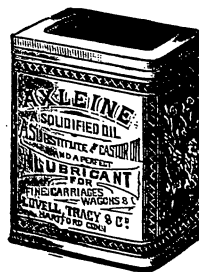
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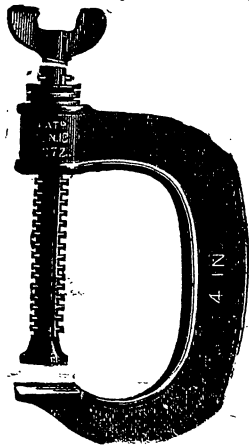
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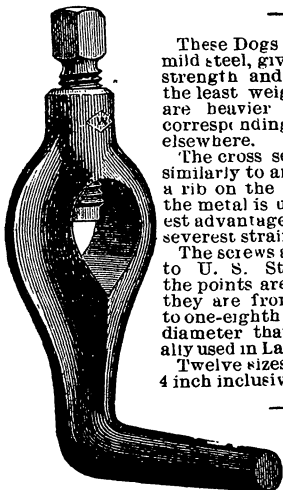
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This Wrench can be furnished with Short Nut.

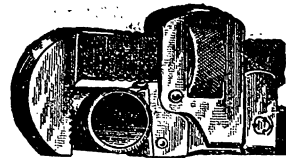


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Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

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Forged Steel

All parts interchangeable.

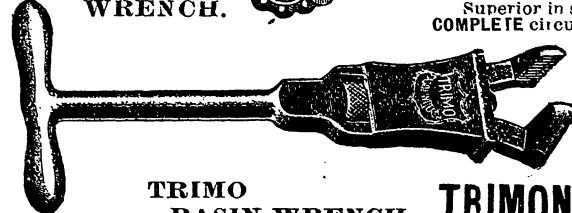
Grips firmly without loss of motion Releases readily. Never locks. Causes no trouble in close quarters. Does not crush the pipe.

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Superior in strength and ease of operation. 7/8 COMPLETE circular grip. Never slips nor crushes.

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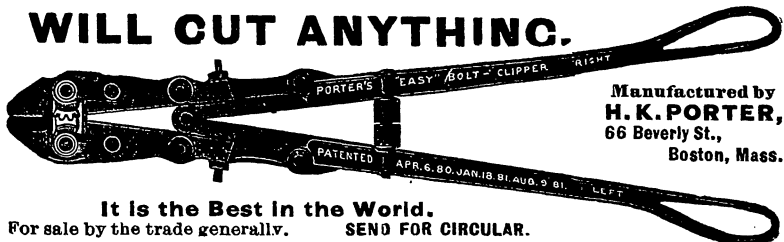
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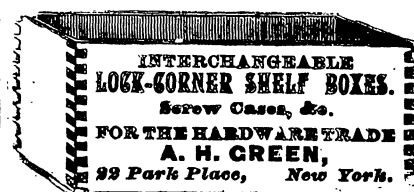
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WILL CUT ANYTHING.**



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It is the Best in the World.
For sale by the trade generally. SEND FOR CIRCULAR.

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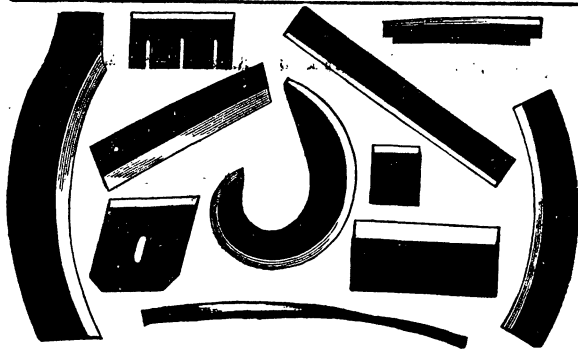
The Handiest, Cheapest and best in existence.

Highest testimonials from those in use. Wholesale agents wanted in every city. Correspondence from Truck Manufacturers solicited. Circulars, price-lists and full particulars furnished.

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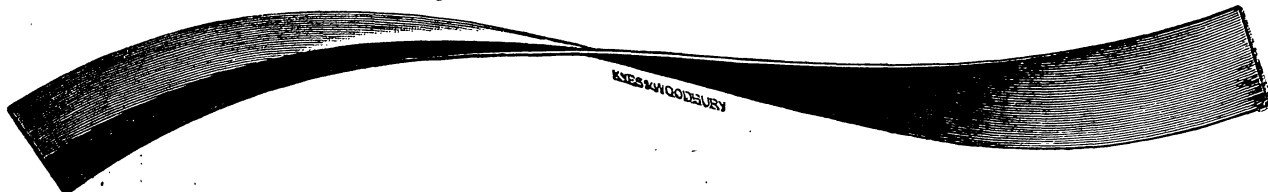
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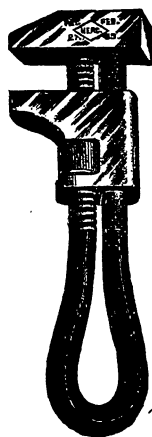
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HERCULES.
Bright Finish.



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Combination Pipe Bolt and
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The Hercules Screw Driver and Tack Claw (Patented).

This Screw Driver is made from one piece of special cast steel, in all sizes, from 1 1/4 in. to 12 in. The blade is well polished, carefully tempered, and every screw driver is subjected to a severe test and warranted. Handles Japanned with the best quality baking Japan.

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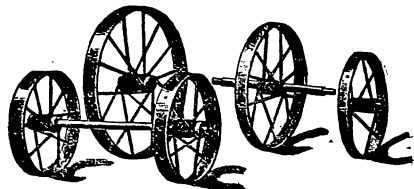
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For ANTHRACITE AND BITUMINOUS MINING
6 DIFFERENT STYLES OF SPOUTS.
SAMPLE 15¢.
SEAMLESS BRASS COLLAR
BRASS HINGE
Solid Lid
No SOLDERING
B.E. LEONARD, Scranton, Pa.

PATENT AIR TUBE MINE LAMP.
FIVE DIFFERENT SIZED SPOUTS
SEND 15 CENTS FOR SAMPLE TO
SEAMLESS BRASS COLLAR
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NO SOLDERING
HINGE CANNOT MELT OFF.
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The best there is made for Wheelbarrows and Trucks. Send for Circular and Prices.

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THE Arnold Metal Wheel Co.

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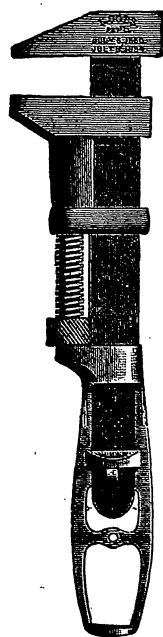
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For Potatoes, Tobacco, Cotton and all small Plants and Vines.

Has given satisfaction to all who have handled it.

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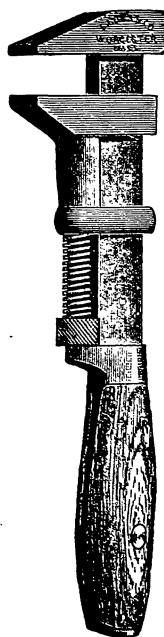
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KNIFE HANDLE
PATENT

Screw Wrenches

MANUFACTURED BY
COES WRENCH CO.,
WORCESTER, MASS.

Established in
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Registered
March 31, 1874.

Patented July
6, 1880.
Patented July
8, 1884.



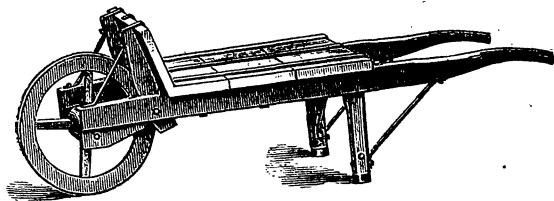
Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

1/2" Straight Bar, Extra Long Nut for Screw in Jaw.

The BEST MADE and STRONGEST WRENCH in the MARKET

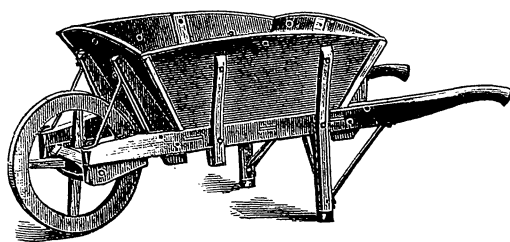
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PIG IRON, SCRAP IRON AND OPEN HEARTH BARROWS.



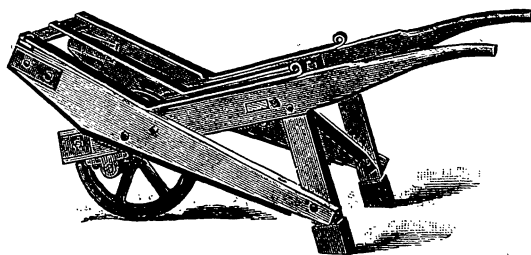
LANSING HAND-MADE PIG IRON BARROW.

Made for carrying pig iron, castings, etc. Size of bottom 3 ft. long by 2 ft. wide, $8\frac{1}{2}$ in. high in front, bottom $1\frac{1}{4}$ in. thick. We iron the bottom of this barrow with strips of $\frac{1}{4}$ -inch iron, which we bolt to the bottom and handles. All irons are bolted, and nothing but first-class timber used in these wheelbarrows. Handles made of 2 x 3 in. white oak or hickory. Wheel very heavy, diameter 19 in., tread $1\frac{3}{4}$ in., tire $\frac{1}{4}$ in. thick. Iron bands on ends of legs. This is a wheelbarrow that will stand work. Weight of barrow 90 pounds.



LANSING HAND-MADE SCRAP IRON BARROW.

This barrow is made for heavy work in and about foundries, rolling mills, machine shops, etc., and is made of the very best seasoned timber. Handles are made of 2 x 3 in. white oak; box is made of $1\frac{1}{4}$ -in. maple. Size of box at top, 26 in. wide at wheel end, 30 in. wide at handle end, 34 in. long. Has a heavy wheel 19 in. in diameter, $1\frac{3}{4}$ in. tread, and has $\frac{1}{4}$ -in. tire; we put heavy iron bands on the ends of the hub. Weight of barrow is 125 pounds. Has iron bands on ends of legs and all iron braces are of $\frac{5}{8}$ -in. round iron. All irons are bolted.



PITTSBURGH OPEN HEARTH BARROW.

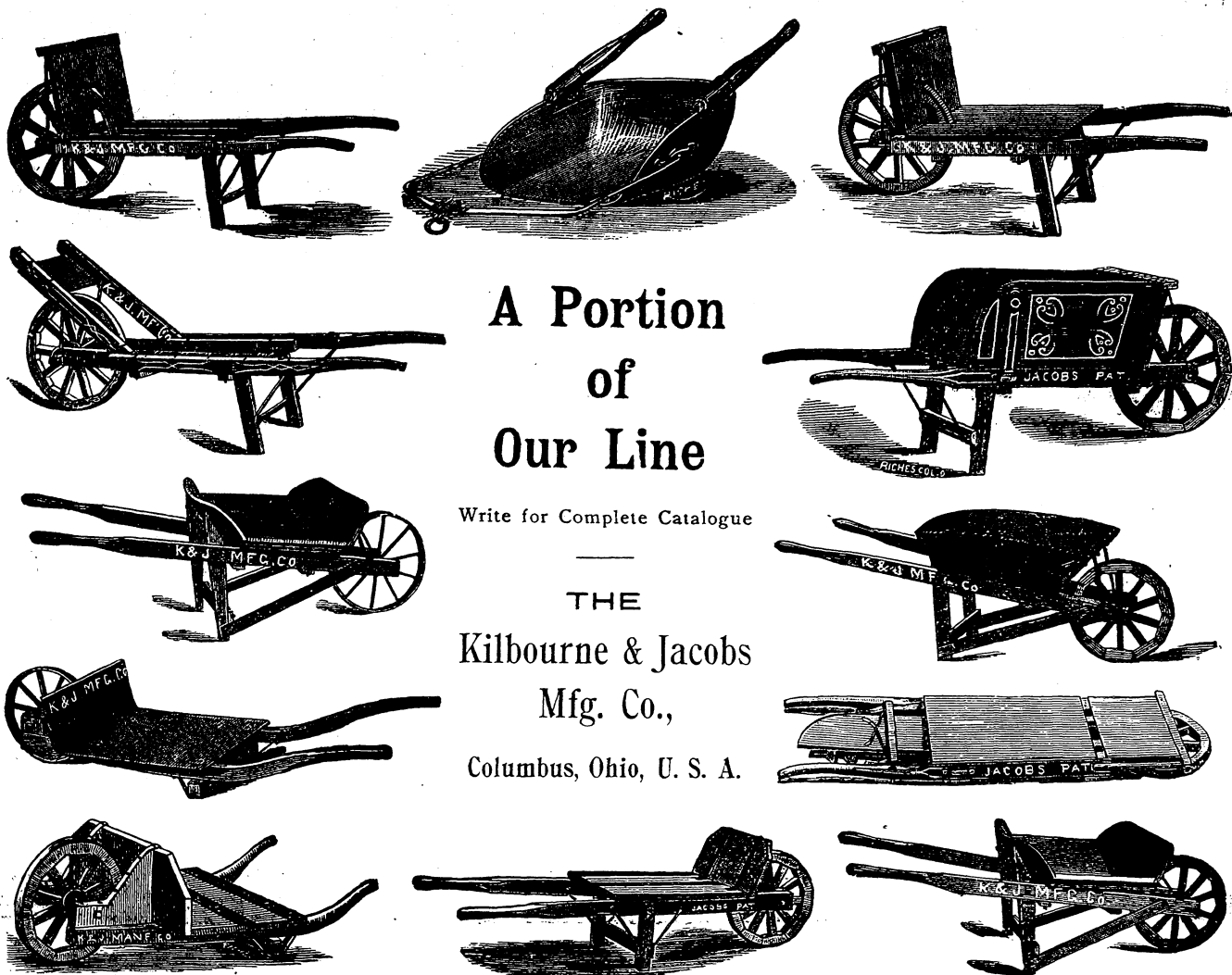
Weight 170 lbs. The heaviest and strongest barrow made. Ironed with half inch iron. Cast iron shoes bolted on legs. The only barrow that will stand carrying pig iron or billets. It will be noticed that the barrow, though so heavy, is very compact, so the load is easily managed. Furnished with 40-lb. Cast Iron wheel.

The barrows shown on this page are the heaviest wooden barrows built and are designed to use about rolling mills and foundries.

Write for Catalogue and Prices.

LANSING WHEELBARROW CO.,

LANSING, MICH.

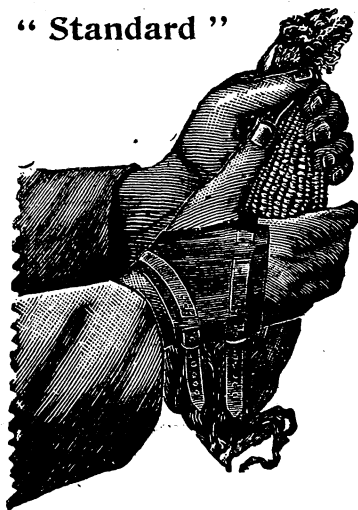


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THE
Kilbourne & Jacobs
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The
"Standard"



Corn Husker

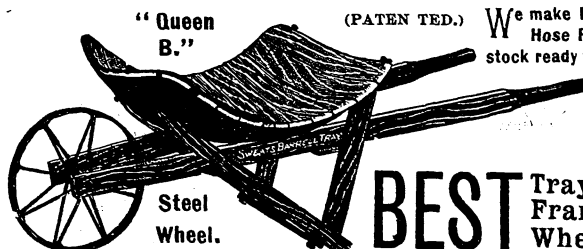
Easier to use, does more work,
can be used in any manner, doesn't
interfere with tying fodder. Guar-
anteed the cheapest practical Husker
made. Write,

Moore & Wickert, Mfrs.,
GREEN SPRING, OHIO.

Beats
Them All.



"BARREL TRAY"
WHEEL BARROWS
ARE
THE **BEST** ON
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We make Barrows of every description, Factory Trucks,
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ALL STEEL

WHEELBARROWS & SCRAPERS

MANUFACTURED BY

AMERICAN STEEL SCRAPER CO.,
1104 Court Street, SIDNEY, O.

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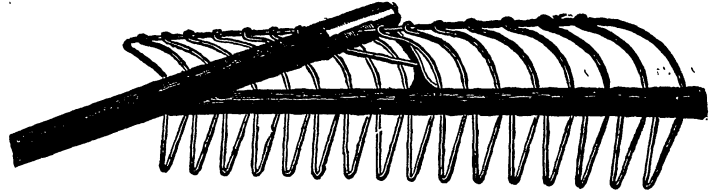
cannot control our prices nor make our goods any better than they are; neither has it any interest in so doing, but you ought to have some interest in them, particularly if you want something good at the price of an inferior production. If you do write

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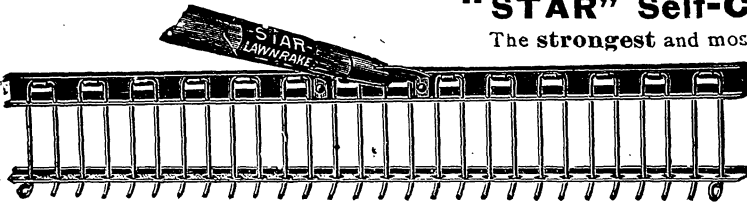
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Both good and each the best. If you have not stocked up, better do so at once. Our prices are low.

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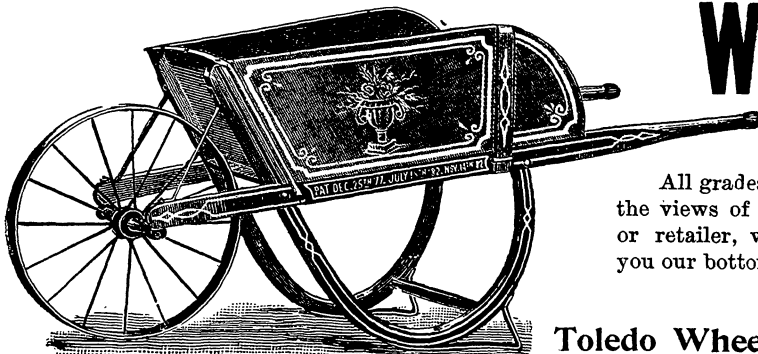


"STAR" Self-Cleaning Lawn Rakes. All Steel.



"STAR" Self-Cleaning Lawn Rake.
Pat. Feb. 21, 1893.

The strongest and most practical rakes in the market. The cleaning bar keeps the teeth free from leaves and grass and the eyes on the end teeth prevent the other teeth from digging in the ground. We also make "STAR" Lawn Rakes as above without the self-cleaning bars and turned up end teeth.
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DIRECT REPRESENTATIVES.

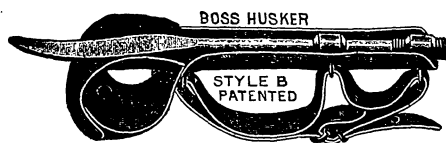


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All grades, all styles, all sizes, at prices that will meet the views of any hardware dealer in the country. Jobber, or retailer, write us your requirements and we will name you our bottom prices.

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TRADE SOLICITED.

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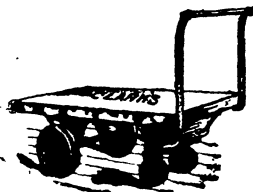
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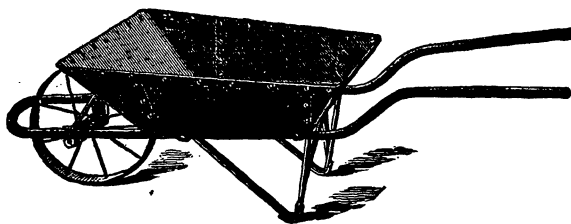
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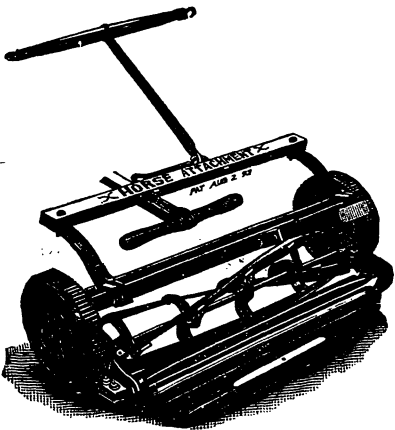
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THE "CHIEF" MOWER

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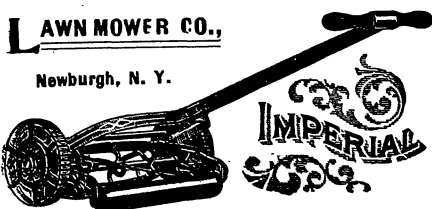
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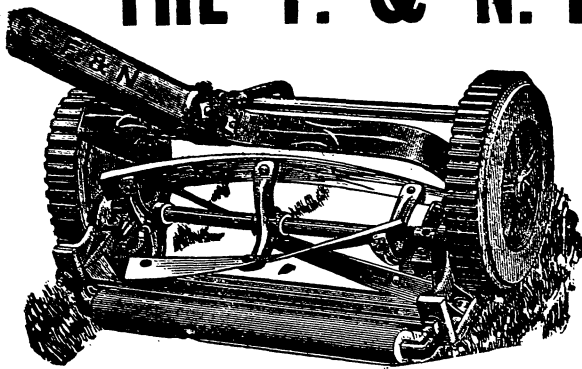
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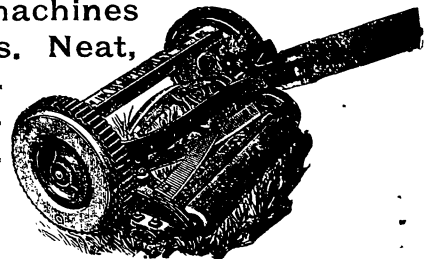
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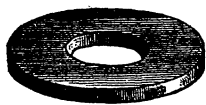
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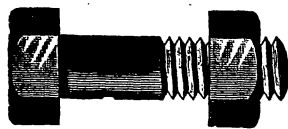
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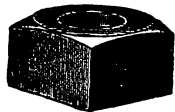


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With hole in
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HOT PRESSED NUTS.

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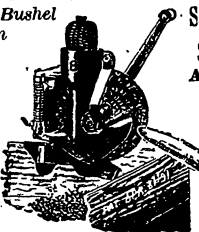
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All Machines
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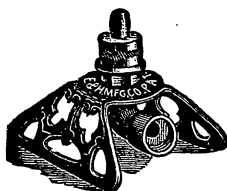
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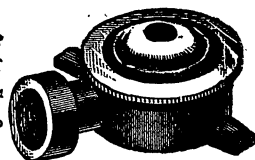


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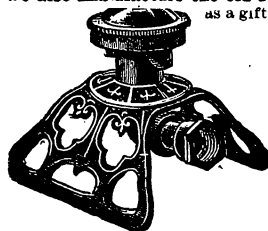
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MADE BY

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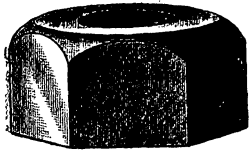
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Port Chester Bolt & Nut Co.,

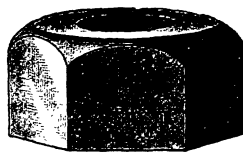
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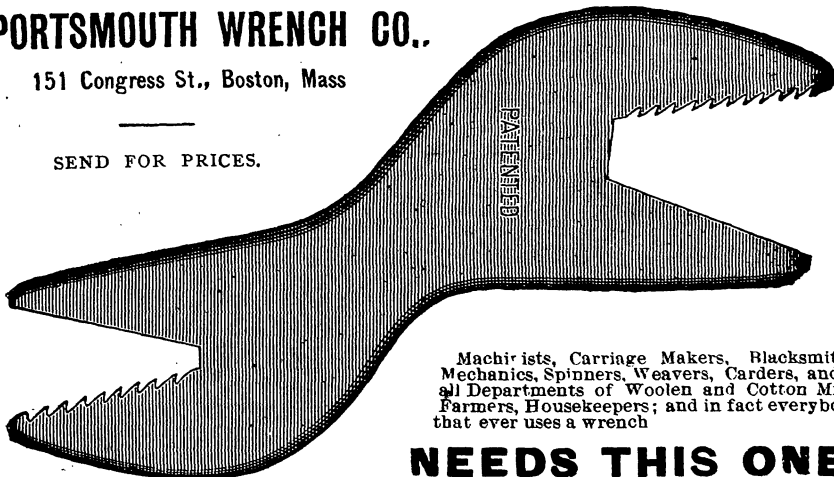
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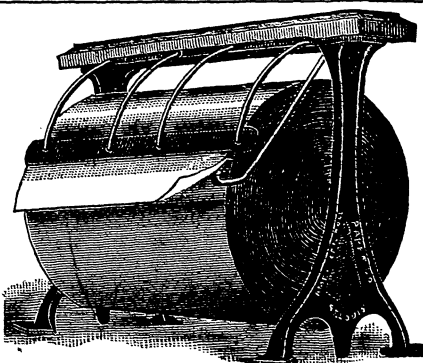
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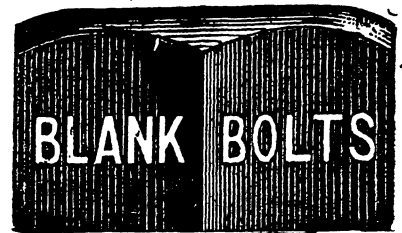
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SUITABLE FOR MACHINERY
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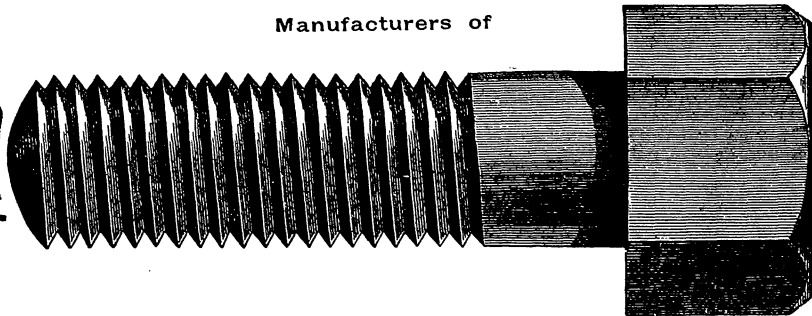
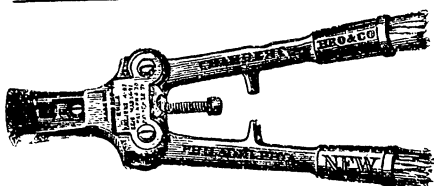
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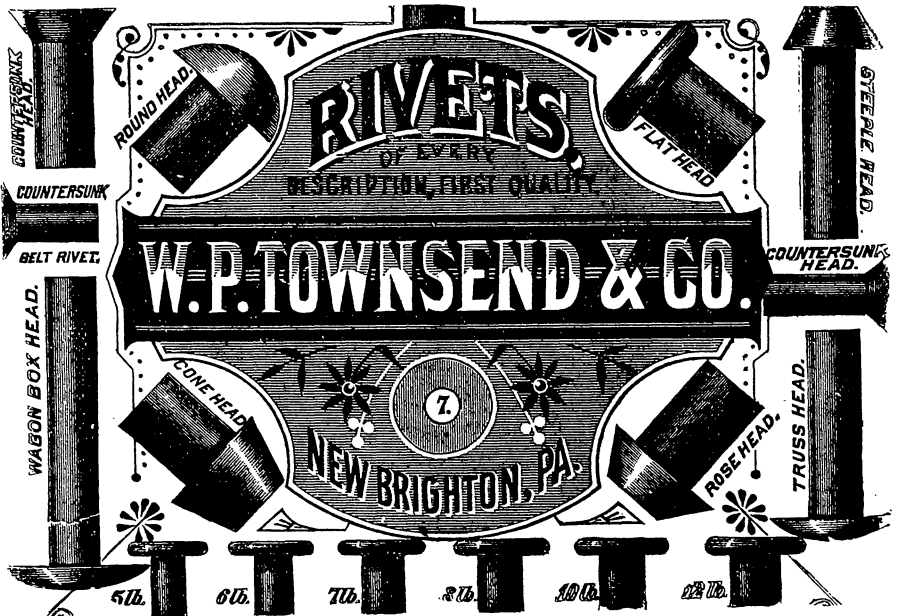
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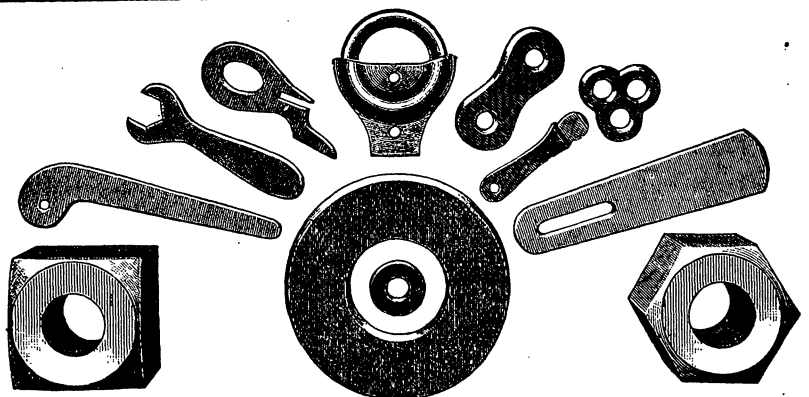
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The Van Dorn Iron Works Co., Cleveland, O.

Fiber Ware.
Standard Fiber Ware Co., Mankato, Minn.

Files, Importers of.
Moss, F. W., 80 John, N. Y.

Files and Rasps, Manufacturers of.
Arcade File Works, Anderson, Ind.
Banker & White, Troy, N. Y.
Barnett, G. & H., 41 & 43 Richmond Phila.
Butcher, W. & S., 135 Duane St., N. Y.
McCaffrey File Co., Philadelphia.
Nicholson File Co., Providence R. I.

Fire Brick, Makers of.
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B. & Sons, foot E. Houston, St. McLeod & Henry Co., Troy, N. Y.
Maurer, H. & Son, 420 E. 23d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Valentine, M. D. & Bro., Woodbridge, Conn.

Fire Sets.
Troy Nickel Works, Troy, N. Y.

Fishing Tackle.
Dane, Stoddard & Kendal, Boston, Mass.

Flint and Emery Paper.
Baeder, Adamson & Co., Phila., Pa.

Flour Sifters.
Meyers, F. J. Mfg. Co., Covington, Ky.

Fly Traps.
Cincinnati Mfg. Co., Cincinnati, O.

Fodder Cutters.
Silver Mfg. Co., Salem, O.

Forges, Portable, &c.
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Sturtevant, B. F. Co., Boston, Mass.

Forgings, Iron and Steel.
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Scranton Forging Co., Scranton, Pa.

Foundry Facings.
Faxon, J. W. & Co., Phila.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.

Foundry Riddles.
Estey, W. S., 65 Fulton, N. Y.

Foundry Supplies.
Collihan, Victor, Detroit, Mich.
S. Obermayer Co., Cincinnati, O.
Faxon, J. W. & Co., Philadelphia.
Smith, J. D. Fdy. Supply Co., Cinn., O.

Friction Clutches.
Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.

Fruit Pickers.
Cleveland Novelty Co., Cleveland, O.

Fruit Presses.
Enterprise Mfg. Co., Philadelphia, Pa.

Furnaces, Foundry.
Byram & Co., Detroit, Mich.

Furnaces, Gasoline.
Burgess Soldering Fee. Co., Columbus, Ohio.

Garden Tools.
Dunlap, C. W., Box 2703, New York

Gas Producers.
Wood, R. D. & Co., Philadelphia, Pa.

Gas & Steam Fitters' Supplies.
Pancoast, Henry B. & Co., Phila., Pa.

Gauge, Rolling Mill.
Haines Gauge Co., Philadelphia, Pa.

Gear Cutters.
D. E. Whiton Mach. Co., New London, Conn.

Gears.
Boston Gear Works Boston, Mass.
Gleason Tool Co., Rochester, N. Y.
New Process Raw Hide Co., Syracuse, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.

Glass Tubes.
Ashcroft Mfg. Co., 111 Liberty St., N. Y.

Glass Cutters.
Monce, S. G., Bristol, Conn.

Grate.
Baeder, Adamson & Co., Phila., Pa.
Kuska Cement Co., Gloucester, Mass.

Grass Catchers.
Supplier Hardware Co., Phila., Pa.
Thompson Mfg. Co., Elkhart, Ind.

Grinding and Polishing Machines.
Herrick & Cowell, New Haven, Conn.
Norton Emery Wheel Co., Worcester, Mass.

Grindstone Dressing Machinery.
Slake & Johnson, Waterbury, Conn.

Grindstones.
Cleveland Stone Co., Cleveland, O.

Gun Implements.
Union Hdw. Co., Torrington, Conn.

Gunpowder, Makers of.
Lafin & Rand Powder Co., 29 Murray St., N. Y.

Halber Chains.
Keller & Woolworth, Niagara Falls, N. Y.

Hand Carts.
Lansing Wheelbarrow Co., Lansing, Mich.

Hand Screws.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

Handles.
Hartwell, E. B., Gallipolis, Ohio.
New Process Raw Hide Co., Syracuse, N. Y.
New York Mallet and Handle Wks., 456 E. Houston St., N. Y.

Hangers, Door.

Cronk Hanger Co., Elmira, N. Y.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.

Hardware Comm'n Merchants.
Docher, Martin, 88 Chambers, N. Y.
Field, Alfred & Co., 93 Chambers St., N. Y.
Graham, John H. & Co., 111 Chambers St., New York.
Jacobus, W. H., 90 Chambers, N. Y.

Hardware Manufacturers.
Dunlap, C. W., Box 2703, New York.
Kotchias, E. S., Bridgeport, Conn.
Russell & Frwin Mfg. Co., Chambers St., New York.
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.

Hardware Mfrs. Agents.
Bingham, W. Co., Cleveland, O.
Graham, John H. & Co., 113 Chambers, Hursey E. J. & Co., 80 John St., N. Y.
McCoy, Jos. F. Co., 26 Warren St., N. Y.
Sickles Sweet & Lyon, 35 Barclay, N. Y.
Underhill, Clinch & Co., 94 Chambers St., N. Y.

Hardware Specialties.
Acme Shear Co., Bridgeport, Conn.
Belden Machine Co., New Haven, Conn.
Clark Mfg. Co., Buffalo, N. Y.
Empire Portable Forge Co., Lansingburg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Gwinn Mfg. Co., Hamilton, O.
Haines & Zimmermann, Phila., Pa.
Hart, H. C. Mfg. Co., Detroit, Mich.
Henn, A. S. & Co., New Haven, Conn.
Johnson, S. C., Racine, Wis.
Knapp & Cowles Mfg. Co., Bridgeport, Conn.
New Britain Hdwr. Mfg. Co., New Britain, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Shepard, Sidney & Co., Buffalo, N. Y.
Welland, Chas., 143 Chambers St., N. Y.
Wilson, J. Fred, Worcester, Mass.
Wire Goods Co., Worcester, Mass.
Underhill, Clinch & Co., 94 Chambers Street, N. Y.

Hardware, Yacht and Ship.
Ferdinand, L. W. & Co., Boston, Mass.

Harness Snaps.
Covert Mfg. Co., West Troy, N. Y.
Covrings' Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.

Hay Knives.
Holt, Hiram, Co., E. Wilton, Me.

Hoisting Machines.
Box, Alfred & Co., 314 Green, Phila.
Jrow' Hoisting & Conveying Mch. Co., Cleveland, Ohio.
Copeland & Bacon, 85 Liberty St. N. Y.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E. Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 96 Liberty, N. Y.
Maris & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Spaul, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.

Hollow Ware.
Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
Stuart & Peterson Co., Phila., Pa.

Hollow Ware, Aluminum.
Illinois Pure Aluminum Co., Lemont, Ill.

Hills and Barbers' Clippers.
Hotchkiss, E. S., Bridgeport, Conn.

Horse Nails, Makers of.
National Horse Nail Co., Vergennes, Vt.

Horse Shoes, Makers of.
Bryden Horse Shoe Co., Catsaqua, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Shoenberger & Co., Pittsburgh, Pa.
Standard Horse Shoe Co., Boston, Mass.

Hose.
Cleveland Rubber Co., Cleveland, O.
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.

Hydrants, &c.
McLean, John, 296 & 298 Monroe, N. Y.

Hydraulic Jacks.
Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.

Ice-Cream Freezers.
North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
White Mountain Freezer Co., Nashua, N. H.

Ice Shavers.
Enterprise Mfg. Co., Philadelphia, Pa.

Injectors.
Fynon-Evans Mfg. Co., Philadelphia, Pa.

Jenkins Bros., New York
Sherwood Mfg. Co., Buffalo, N. Y.

Insurance, Boiler.
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Iron and Steel, Swedish.
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.

Iron Commission Brokers.
Corning, Edw. & Co., 39 B'way, N. Y.
Cotton, Bradley & Co., Philadelphia.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Koffman, J. W. & Co., Philadelphia.
Levin, Henry & Co., Philadelphia.
Keeley, Jerome & Co., Philadelphia.
Lee, J. Tatnall & Co., Philadelphia.
Mohr, J. J., 430 Walnut, Philadelphia.
Mann, E. R. & Co., Philadelphia.
Pilling & Orane, Philadelphia, Pa.
Silbott, Geo. H. & Co., Chicago, Ill.
Wilsheim & Co., Harrisburg, Pa.
Wister, L. & R. & Co., Phila., Pa.

Iron Ore.
Naylor & Co., 45 Wall, N. Y.
Pickands, Brown & Co., Chicago, Ill.
Fullman, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.

Iron, Merchants.
Barnes, O. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Bussanits & Cunliffe, Philadelphia.
Corning Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Koffman, J. W. & Co., Philadelphia.
Leonard, J., 44 W. 3d St., N. Y.
Naylor & Co., 45 Wall St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pickands, Brown & Co., Chicago, Ill.
Pierson & Co., 29 Broadway, N. Y.
Richards, D. W. & Co., 88 Washington St., N. Y.
Thomson, W. H. & Co., Phila., Pa.
Wallace, Wm. E. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.

Iron, Importers.
Abbott, Jere & Co., N. Y. and Boston.
Lundberg, Gustaf, Boston, Mass.

Iron, Sheet, Manufacturers of.
Cambridge Iron & Steel Co., Cambridge Ohio
W. Dewees Wood Co., Lim., McKeesport, Pa.

Ironwork, Ornamental.
Barum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Lange Fence & Wire Co., St. Louis, Mo.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.

Keys.
Wollensak, J. F., Chicago, Ill.

Ladies.
Detroit Fdy. Equipment Co., Detroit, Mich.

Lamp Stoves.
Glazier Stove Co., Chelsea, Mich.

Lanterns.
Dietz, R. E., Co., 60 Leight St., N. Y.
Ohio Lantern Co., Tiffin, Ohio.
Steam Gauge & Lantern Co., Syracuse, N. Y.

Lathes.
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Lathing, Wire.
Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.

Laundry Machines.
Johnson, S. C., Racine, Wis.

Lawn Mowers.
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.
Champion Mfg. Co., Richmond, Ind.
Coldwell Lawn Mower Co., Newburgh, N. Y.
F. & N. Mfg. Co., Richmond, Ind.
Hensley, M. C., Richmond, Ind.
Lape, W. E., Syracuse, N. Y.
Mast, Foss & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supplier Hdw. Co., Phila., Pa.

Lawn Rakes.
Schaefer & Co., Dayton, Ohio.
Syracuse Specialty Mfg. Co., Syracuse, N. Y.

Lawn Sprinklers.
Ette & Henger Mfg. Co., St. Louis.
McGowan, John H. Co., Cincinnati, O.

Lawn Sweepers.
Lape, W. E., Syracuse, N. Y.

Lemon Squeezers.
Ripley Mfg. Co., Unionville, Conn.

Letters and Figures, Metallic.
White, A. A. & Co., Providence, R. I.

Letters, Paper.
Tablet & Ticket Co., Chicago, Ill.

Levels.
D. Cook, Watertown, N. Y.
Richardson, O. F., & Son Athol, Mass.

Locks & Knobs, Manufacturers of.
Delta, A. E., 97 Chambers, N. Y.
Keyless Lock Co., Chicago, Ill.
Reading Hdwr. Co., Reading, Pa.
Romer & Co., Newark, N. J.
Smita & Egge Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.

Lubricators.
Wadhams Oil & Grease Co., Milwaukee, Wis.

Machinery.

Am. Tool Works, Cleveland, Ohio.
 Barnes, W. F. & John, Rockford, Ill.
 Sement, Miles & Co., Philadelphia, Pa.
 Sigel, C. E., 46 Day, N. Y.
 Signal & Keeler Mfg. Co., St. Louis, Mo.
 Birmingham Iron Foundry, Birmingham, Conn.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Bogert, Jno. L., Flushing, N. Y.
 Briggs, Marvin, 12 Broadway, N. Y.
 Carlin's Sons, Thos., Allegheny, Pa.
 Ohio Milling Mach. Co., Cincinnati, Ohio.
 Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
 Coulter & McKensie Mch. Co., Bridgeport, Conn.
 Crutkshank, D. B., Providence, R. I.
 Decker & Harvey Mch. Co., Baltimore, Md.
 Fitchburg Mch. Works, Fitchburg, Mass.
 Garvin Mch. Co., Laight & Canal Sts.
 Gould & Eberhardt, Newark, N. J.
 Hamilton Mch. Tool Co., Hamilton, O.
 Harrington, E. S. & Co., Phila.
 Henderson, A. L., Wilmington, Del.
 Hendey Machine Co., Torrington, Conn.
 Henley Mch. Tool Wks., Richmond, Ind.
 Hill, Clarke & Co., Boston, Mass.
 Ingersoll Milling Machine Co., Rockford, Ill.
 Johnson, Israel H., Jr., & Co., Phila.
 Jones & Lamson Mch. Co., Springfield, Vt.
 Kelly, Daniel, Phila., Pa.
 Lodge & Snipley Mch. Tool Works, Cincinnati, O.
 Lovegrove & Co., Philadelphia, Pa.
 McCabe, J. J., 68 Cortlandt, N. Y.
 Machinists Supply Co., Rochester, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Conn.
 Morton Mfg. Co., Muskegon Heights, Mich.
 National Machinery Co., Tiffin, Ohio.
 Newark Mch. Tool Works, Newark, N. J.
 New Haven Mfg. Co., New Haven, Conn.
 New York Mach. Depot, N. Y.
 Niles Tool Wks., 138 Liberty St., N. Y.
 Pedrick & Ayer, Philadelphia, Pa.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Place, Geo., 120 Broadway, N. Y.
 Poole, Robt. & Son Co., Baltimore, Md.
 Powell Planer Co., Worcester, Mass.
 Pratt & Whitney Co., Hartford, Conn.
 Prouty Tool & Supply Co., N. Y.
 Scranton Supply & Mch. Co., Scranton, Pa.
 Sellers, Wm. & Co., Phila.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Steptoe, J. & Co., Cincinnati, O.
 Stow Flexible Shaft Co., Ltd., Phila.
 Toomey, Frank, Philadelphia, Pa.
 Wetherill, Robert & Co., Chester, Pa.
 Wilson, W. A., Rochester, N. Y.
 Woodruff Mfg. Co., Hartford, Conn.

Machinery for Hardware Manufacturers.

Adt. Jno. & Son, New Haven, Conn.

Machine Knives.

Loring Coes & Co., Worcester, Mass.

Machine Tools.—See Machinery.**Machine Work.**

Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.

Coffin & Leighton, Syracuse, N. Y.
 Starrett, L. S., Athol, Mass.

Machinists' Tools and Supplies.

King, J. M. & Co., Watford, N. Y.
 Sellers, Wm. & Co., Inc., Phila.

Mallets.

N. Y. Mallet & Handle Works, N. Y.

Mangles.

Johnson, S. C., Racine, Wis.

Manufacturing Sites.

Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.

Measuring Tapes.

Keuffel & Esser Co., 127 Fulton St., N. Y.
 Lufkin Rule Co., Saginaw, Mich.

Meat Cutters.

Enterprise Mfg. Co., Philadelphia, Pa.

Metals.

Fearing, Wm. S., 100 Chambers, N. Y.
 Hendricks Bros., 49 Cliff, N. Y.
 Naylor & Co., 45 Wall, N. Y.

Metal Brokers.

American Metal Co., N. Y.

Metalurgists.

Britton, J. Blodgett, Phila.

Metal Saws.

Q & C Co., Chicago, Ill.

Milling Machines.

Cin. Milling Mch. Co., Cincinnati, Ohio.
 Ingersoll Milling Machine Co., Rockford, Ill.
 Pedrick & Ayer, Phila. Pa.

Mining Knives.

Palmer Hdw. Mfg. Co., Troy, N. Y.

Mine Lamps.

Darby, Edw. & Sons, Phila. Pa.
 Leonard, E. E., Scranton, Pa.
 Leonard, T. F., Scranton, Pa.

Mining Screens.

Harrington & King Perforating Co., Chicago, Ill.
 Howard & Morse, 45 Fulton, N. Y.

Mirrors.

Rice, C. F., Chicago, Ill.

Mitre Boxes.

Olmsted, L. H., Hasbrouck Heights, N. J.

Molding Sand.

Obermayer, S. Co., Cincinnati, O.
 Paxson, J. W. & Co., Phila.

Motors, Water and Electric.

C. & C. Electric Motor Co., 402 and 404 Greenwich St., N. Y.
 Dallett, Thos. H. & Co., Phila., Pa.

Nail Machinery.

Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nails (Cut) and Spikes.

Borden & Lovell, 70 West, N. Y.
 Cumberland Nail & Iron Co., Phila.
 Oxford Iron Co., 81 Washington St.,
 Pottstown Iron Co., Pottstown, Pa.
 Riverside Iron Wks., Wheeling, W. Va.

Nickel Platers' Supplies.

Hanson & Van Winkle Co., Newark, N. J.
 Zucker & Levett Chemical Company, 10 to 14 Grand St., N. Y.

Norway Shapes, Rollers of.

Rowland, William & Harvey, Frankford, Philadelphia

Nut Machines.

Dunham Nut Mch. Co., Unionville, Ct.

Nuts, Bolts, &c., Makers of.

American Bolt Co., Lowell, Mass.
 American Screw Co., Providence, R. I.
 Blake & Johnson, Waterbury, Conn.
 Taskell, Wm. H. Co., Pawtucket, R. I.
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.
 Port Chester Bolt and Nut Co., Chester, N. Y.
 Russell, Burdall & Ward, Port Chester, N. Y.
 Sternberg, J. H. & Son, Reading, Pa.
 Wilson, J. Fred, Worcester, Mass.
 Wm. H. Haskell Co., Pawtucket, R. I.

Oil Cans and Lubricators.

Sherwood Mfg. Co., Buffalo, N. Y.

Oil Stones.

Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.

Glazier Stove Co., Chelsea, Mich.

Orange Shears.

Henry, J. T., Mfg. Co., Hamden, Conn.

Ores.

Wister, Francis, Philadelphia, Pa.

Presses.

Scranton Forging Co., Scranton, Pa.

Pressing.

Billington, Jas. H. & Co., Phila., Pa.
 Morrison, Robt., St. Louis, Mo.
 N. Y. Beltina & Packing Co. Ltd., N. Y.

Radicals.

Ames Sword Co., Chicopee, Mass.
 Fram, E. T., Lancaster, Pa.
 Hillebrand & Wolf, Phila., Pa.
 Miller Lock Co., Philadelphia, Pa.

Paint.

Dixon, Jos. Crucible Co., Jersey City, N. J.

Paint Burners.

Dangler Stove & Mfg. Co., Cleveland, O.

Paint Cans.

Willmot & Hobbs Mfg. Co., Bridgeport, Conn.

Patent Solicitors.

Fitzgerald, S. C., Washington, D. C.
 Howson & Howson, Phila. & Washgton.
 Jenner, H. W. T., Washington, D. C.
 Stocking, E. B., Washington, D. C.

Peanut and Coffee Reaster.

Olsen, A. B., Kansas City, Mo.

Perforated Metal.

Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Phosphor Bronze.

Phosphor Bronze Smelting Co., Limited, 612 Arch, Philadelphia.

Phosphor Tin.

Crescent Phosphorized Metal Co., Philadelphia, Pa.

Crosby Steam Gate & Valve Co., Boston, Mass.

Halk & Naumann, 516 Pearl, N. Y.

Picks and Mattocks.

Plumb, Fayette H., Philadelphia, Pa.

Pig Iron.

Eden, C. B. & Co., Philadelphia, Pa.
 Mann, Edwin R., Philadelphia, Pa.
 Montour Iron & Steel Co., Danville, Pa.
 Naylor & Co., 45 Wall, N. Y.
 Pickands, Brown & Co., Chicago, Ill.
 Pilling & Crane, Philadelphia, Pa.
 Samuel, Frank, Philadelphia, Pa.

Pig Iron Storage.

Am. Pig Iron Storage Warehouse Co., 44 Wall, N. Y.

Pile Drivers.

Vulcan Iron Wks., Chicago, Ill.

Pipe, Bent.

National Pipe Bending Co., New Haven

Pipe Cutting and Threading Machines.

Signal & Keeler Mfg. Co., St. Louis, Mo.
 Merrill Mfg. Co., Toledo, O.
 Pancoast Henry B. & Co., Philadelphia.
 Gaunders Sons, D., Yonkers, N. Y.

Pipe Grips.

Prentiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c., Makers of.

McNab & Harlin Mfg. Co., N. Y.

Pipe, Water and Gas, Makers of.

Cumberland Nail & Iron Co., Phila. Pa.
 Donaldson Iron Co., Emaus, Pa.
 Riverside Iron Works, Wheeling, W. Va.
 Wood, R. D. & Co., Philadelphia, Pa.

Plane Irons, Manufacturers of.

Buck Bros., Millbury, Mass.

Planes, Manufacturers of.

Stanley Rule & Level Co., N. Y.

Plate, Iron and Steel, Mfrs of.

Etna-Standard Iron & Steel Co., Bridgeport, Ct.

Stevens Iron & Steel Co., Coatesville, Pa.

Mahoning Valley Iron Co., Youngstown, Ohio.

Moorehead-McLean Co., Pittsburgh, Pa.

Mellvain & Sons, Reading, Pa.

Pottstown Iron Co., Pottstown, Pa.

Pottsville Iron & Steel Co., Pottsville, Pa.

Singer, Nimick & Co., Pittsburgh, Pa.

The Mahoning Valley Iron Co., Youngstown, O.

Wellman Iron & Steel Co., Thurlow, Pa.

Woodman Co., Philadelphia.

Plating, Nickel, Brass and Silver.

Willmot & Hobbs Mfg. Co., Bridgeport, Conn.

Pokers and Lifters.

Troy Nickel Works, Troy, N. Y.

Polishing Machines.

Watson & Stillman, 204 E. 43d, N. Y.

Polishing Wheel.

La Massena, C. E. & Co., Newark, N. J.

Post Hole Diggers.

Buckeye Mfg. Co., Union City, Ind.
 Kohler, F. E. & Co., Canton, Ohio.
 Wister, L. E. & Co., Philadelphia, Pa.

Pressing Nettings.

Baum, E. T., Detroit, Mich.
 Gilber & Bennett Mfg. Co., 42 Cliff St., N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.
 "Silver Finish."
 Tyler Wire Wks. Co., W. S., Cleveland, O.
 Wright & Colton Wire Cloth Co., Worcester, Mass.

Power.

Lawson & Rand Powder Co., 29 Murray

New York Powder Co., 62 Liberty St., N. Y.

Power Hack Saws.

Millers Falls Co., 93 Beade St., N. Y.

Power Hammers.

Belden Mch. Co., New Haven, Conn.
 Oienelt & Eisenhardt, Philadelphia.
 Dupont Mfg. Co., St. Johnsbury, Vt.
 Jenkins & Lingie, Bellefonte, Pa.
 Long & Allstetter Co., Hamilton, Ohio.

Presses, Dies, &c.

E. W. Bliss Co., Brooklyn, N. Y.
 Crosby, G. A. & Co., Chicago, Ill.
 Ferracute Mch. Co., Bridgeport, N. J.
 Niagara Stamping & Tool Co., Buffalo, N. Y.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Waterbury Mch. Co., Waterbury, Conn.

Presses, Power, Makers of.

Bliss, E. W. Co., Brooklyn, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Ct.
 Merriam, A. H., Meriden, Conn.
 Niagara Stamping and Tool Co., Buffalo, N. Y.
 Robinson, J. M. & Co., Cincinnati, O.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Pulley Fixings.

Foley, J. W. & Co., Cincinnati, O.

Pulleys.

Great Western Pin Co., Toledo, O.
 Keystone Clutch Mch. Wks., Phila., Pa.
 Reeves Pulley Co., Columbus, Ind.

Pulverizing Mill.

Bradley Fertilizer Co., Boston, Mass.

Reaming Machinery.

Coulter & McKensie Mch. Co., Bridgeport, Conn.

Dean Bros. Steam Pump Works, Indianapolis, Ind.

Hooker-Colville Steam Pump Co., Chicago, Ill.

Lucas, C. O. & Co., Greenville, Ohio.

McCowan, J. H. & Co., Cincinnati, O.

Maalin, J. & Son, Jersey City, N. J.

Norwalk Iron Wks. Co., So. Norwalk, Conn.

Southwark Fdy. & Mch. Co., Phila., Pa.

Valley Pump Wks., Easthampton, Mass.

Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Pumps, Makers of.

Bellevue Pump Co., Bellevue, Iowa.
 Belmont Co., Salem, O.
 Douglas, W. & B., Middletown, Conn.
 Mast, Foss & Co., Springfield, O.
 Myers, F. E. & Bro., Ashland, O.

Punches and Shears, Hand and Power.

Bertsch & Co., Cambridge City, Ind.
 E. W. Bliss Co., Brooklyn, N. Y.
 Cockburn Barrow & Mch. Co., Jersey City, N. J.
 Crosby, G. A. & Co., Chicago, Ill.
 Ferracute Mch. Co., Bridgeport, N. J.
 Hengerer, A. L., Wilmington, Del.
 Long & Allstetter Co., Hamilton, Ohio.
 Niagara Stamping and Tool Co., Buffalo, N. Y.
 Robinson, J. M. & Co., Cincinnati, O.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Wals & Roos, Punch & Shear Co., Cincinnati, Ohio.
 Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.

Watson & Stillman, 204 E. 43d, N. Y.

Rails, Old and New.

Perry, W. H. & Co., Providence, R. I.
 Schwarzenberg Bros. & Co., Cleveland, O.

Rat and Mouse Traps.

Burditt & Williams, Boston, Mass.
 Estey, W. S., 65 Fulton, N. Y.
 Ripley Mfg. Co., Unionville, Conn.
 Sun Mfg. Co., Greenfield, O.

Razors.

Butcher, W. & S., 135 Duane St., N. Y.
 Curley, J. & Bro., 6 Warren St., N. Y.
 Electric Cutlery Co., 113 Chambers, N. Y.
 Schuchman, E. & John, 92 Beade St., N. Y.
 J. B. Torrey Razor Co., Worcester, Mass.

Reels.

Hendryx, A. B. Co., New Haven, Conn.

Refrigerator Door Fasteners.

Conroy, P. J. & Co., Philadelphia.

Rivers.

Riaker & Johnson, Waterbury, Conn.
 Boyce Bat. Co., Muncie, Ind.
 Borden Iron Co., Tr. N. Y.
 Cobb & Drew, Plymouth, Mass.
 Henderson, Jas. S., 165 Greenwich, N. Y.
 Plymouth Mills, Plymouth, Mass.
 Sternberg, J. H. & Son, Reading, Pa.
 Townsend, W. F. & Co., New Brighton, Pa.

Riveting Machines.

Adt. Jno. & Sons, New Haven, Conn.

Rock Drills.

Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
 Band Drill Co., 23 Park Place, N. Y.

Rolling Mill Machinery.

Birmingham Iron Fdry, Birmingham, Conn.

Booth, The Lloyd Co., Youngstown, O.

Leeburg Foundry & Mch. Co., Pittsburgh, Pa.

Mahoning Fdry & Mch. Co., Danville, Pa.

Morgan Construction Co., Worcester, Mass.

Robinson-Rea Mfg. Co., Pittsburgh.

Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Trethewey Fgy. Co., Pittsburgh, Pa.

Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

Roll Lathes.

Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel.

Booth, The Lloyd Co., Youngstown, O.

Garrison, A. Fdry. Co., Pittsburgh, Pa.

Johnson Foundry Co., Johnstown, Pa.

Seaman, Sleeth & Black, Pittsburgh.

Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Roofing.

Berlin Iron Bridge Co., E. Berlin, Conn.

Boston Bridge Works, Boston, Mass

Allentown Rolling Mill. Allentown, Pa.
Illinois Steel Co. Chicago, Ill.
Lockhart Iron & Steel Co. Pittsburg, Pa.
Passaic Rolling Mill Co. Paterson, N. J.
Pottsville Iron & Steel Co. Pottsville, Pa.
Roberts, A. & P. Co. Phila., Pa.
The Phoenix Iron Co. Phila., Pa.
Tudor Iron Works. St. Louis, Mo.

Shears and Scissors.
Acme Shear Co. Bridgeport, Conn.
Heinrichs, R. Sons Co. Newark, N. J.

Sheet Iron and Steel, Manufacturers of.
Atlas Standard Iron and Steel Co. Bridgeport, O.
Cambridge Iron & Steel Co. Cambridge, Ohio.
Chas. Bros. Pittsburgh, Pa.
Mahoning Valley Iron Co. Livingston, Ohio.
Moorehead-McCleane Co. Pittsburgh, Pa.
Peterson & Co. 29 Broadway, N. Y.
Rely, John W. Fort Hunter, P. O., Pa.
Singer, Nimick & Co., Ltd. Pittsburgh, Pa.
The Mahoning Valley Iron Co. Youngstown, O.
Alan Wood Co. Philadelphia.
W. Dewees Wood Co. McKeesport, Pa.

Sheet Metal Work.
Clark & Cowles. Plainville, Conn.

Sheet Zinc.
Mathieson & Hegeler Zinc Co. La Salle, Ill.

Shelf Brackets.
Koch, A. B. & Co. Peoria, Ill.

Shipping Blanks.
Barlow Bros. Grand Rapids, Mich.

Shovels, Spades and Scoops.
Myers, H. M. Co. Beaver Falls, Pa.

Sinks.
Douglas, W. & B. Middletown, Conn.

Skates, Ice.
Dame, Stoddard & Kendall. Boston, Mass.
Sickels, Sweet & Lyon. 25 Barclay St., N. Y.

Skates, Roller.
Heuley, M. C. Richmond, Ind.
Union Hardware Co. Torrington, Conn.
Winslow, Sam'l. Skate Mfg. Co., Worcester, Mass.

Smelting Works.
Reeves, Paul S. 760 S. Broad, Phila.

Speaking Tubes.
Ostrander, W. R. & Co. 204 Fulton St., N. Y.

Specialties, Pat. Articles.
Konigsberg, O. Cleveland, O.

Speed Indicators.
Church & Slight. 109 Fulton St., N. Y.

Spelter.
Mathieson & Hegeler Zinc Co. La Salle, Ill.

Spoons and Forks.
Holmes & Edwards Silver Co. Bridgeport, Conn.
Rogers, The Wm. Mfg. Co. Hartford, Conn.

Sporting Goods.
Hartley & Graham. 313-315 E. 22d St., N. Y.

Spring Hinges.
Bardsley, J. 149 & 151 Baxter St., N. Y.
Pullman Sash Balance Co. Rochester, N. Y.

Spring Keys and Cutters.
Whitman & Barnes Mfg. Co. Syracuse, N. Y.

Sprinklers.
Smith, Oliver A. Clarkston, Mich.

Stamped Ware.
Am. Stamping Co. 104 & 106 John St., New York

Stamping Works.
Cleveland Stamping & Tool Co. Cleveland, O.

Staples.
Cobb & Drew. Plymouth, Mass.
Titchener E. H. & Co. Binghamton, N. Y.

Steam Gauges.
Ascher, H. Mfg. Co. 111 Liberty St., N. Y.
Bristol Mfg. Co. Waterbury, Conn.

Steam Hammers, &c., Makers of.
Dienelt & Eisenhardt. Philadelphia.
Dudgeon, Richard. 24 Columbia Street, N. Y.

Steam Heating.
Webster Warren & Co. Camden, N. J.

Steam Separators.
Goubert Mfg. Co. 32 Cortland St., N. Y.
Harrison Safety Boiler Wks. Phila., Pa.

Steel Balls.
Grant Anti-Friction Ball Co. Fitchburg, Mass.

Steel, Cold Rolled Strip.
Wilmot & Hobbs Mfg. Co. Bridgeport, Conn.

Steel Figures and Alphabets.
Krogerud, W. 61 Fulton, N. Y.

Steel Importers.
Abbott, Jere & Co. N. Y. and Boston.
Hobson, Francis, Seaman & Co. 9 John St., N. Y.
Jessop, Wm. & Sons. Sheffield, Eng.
Land, or 91 John, N. Y.
Maline, A. & Co. 1 Broadway, N. Y.
Newton & Shipman. 83 John, N. Y.
Wetherell Bros. 93 Liberty St., N. Y.
Wm. A. R. & Co. B'way, N. Y.
Wolfe, R. H. & Co., Ltd. 118th Street and Harlem River, N. Y.

Steel (Mushet's Special).
Jones, B. M. & Co. Boston.

Steel Manufacturers.
Atlas-Standard Iron & Steel Co. Bridgeport, O.
Bethlehem Iron Co. S. Bethlehem, Pa.
Baker, Herman & Co. 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.
Chester Steel Castings Co. Phila., Pa.
Chrome Steel Works. Brooklyn, N. Y.
Crecent Steel Co. Pittsburgh, Pa.
Eaton & Co. Hazen, Vt.
Frankford Steel Co. Philadelphia.
Gautier Steel Department of Cambria Iron Co. Johnstown, Pa.
Hobson, Francis, Seaman & Co. 9 John St., N. Y.
Illinois Steel Co. Chicago, Ill.
Jessop, Wm. & Sons. Sheffield, Eng.
Land, or 91 John, N. Y.
Kayser, Ellison & Co. Sheffield, Eng.
La Belle Steel Co. Pittsburgh, Pa.
Lukens Iron & Steel Co. Coatesville, Pa.
Moorehead-McCleane Co. Pittsburgh, Pa.
Moss, F. W. 83 John, N. Y.
Naylor & Co. 45 Wall, N. Y.
Pottsville Iron and Steel Co. Pottsville, Pa.
Rely, J. W. Fort Hunter, P. O., Pa.
Rowland, Wm. & Harvey. Frankford, Philadelphia.
Singer, Nimick & Co. Pittsburgh.
Stanley Works. New Britain, Conn.
Steel & Iron Improvement Co. Pittsburgh, Pa.
Taylor Iron & Steel Co. High Bridge, N. J.
Wordlaw, S. & C. Sheffield, Eng.
Wetherell Bros. 93 Liberty, N. Y.
Wilmot & Hobbs Mfg. Co. Bridgeport, Conn.

Steel, Manufacturers' Agents.
Barnes, C. K. & Co. Philadelphia, Pa.
Corning, Edw. & Co. 29 B'way, N. Y.
Lindsay, Jas. G. & Co. Phila., Pa.
Peterson & Co. 29 Broadway, N. Y.

Steel Rails, Manufacturers of.
Bethlehem Iron Co. S. Bethlehem, Pa.
Cambria Iron Co. Johnstown, Pa.
Illinois Steel Co. Chicago, Ill.
Montour Iron & Steel Co. Danville, Pa.
Riverside Iron Wks. Wheeling, W. Va.

Steel, Tool.
Frankford Steel Co. Philadelphia, Pa.
Jessop, Wm. & Sons. Sheffield, Eng.
Land, 91 John, N. Y.
Jones, B. M. & Co. Boston, Mass.
La Belle Steel Co. Pittsburgh, Pa.

Step Ladders.
Bicycle Step Ladder Co. Chicago, Ill.
Croissant, M. Albany, N. Y.

Stocks and Dies.
Armstrong Mfg. Co. Bridgeport, Conn.
Knights & Spencer. Hartford, Conn.
Butterfield & Co. Derby Line, Vt.
Hart Mfg. Co. Cleveland, O.
Saunders' Sons, D. Yonkers, N. Y.
Wells Bros. & Co. Greenfield, Mass.
Wiley & Russell Mfg. Co. Greenfield, Mass.

Storage.
Security Warehouse. E. St. Louis, Ill.

Stove Linings.
Ostrander Fire Brick Co. Troy, N. Y.

Stove Pipe Thimbles.
Cheney, S. & Son. Manlius, N. Y.

Stove Trimmings.
Troy Nickel Works. Troy, N. Y.

Street Lamps.
Dietz, R. E. & Co. 60 Light St., N. Y.
Steam Gauge & Lantern Co. Syracuse, N. Y.

Strops.
Electric Outlery Co. 113 Chambers, N. Y.
J. R. Torrey & Co. Worcester, Mass.

Strapping Machines.
Schmitz, E. Lothar. 92 Reade St., N. Y.

Structural Iron Work.
Berlin Iron Bridge Co. East Berlin, Conn.
Boston Bridge Wks. Boston, Mass.
Lindsay, Jas. G. & Co. Phila., Pa.
Wrought Iron Bridge Co. Canton, O.

Sulphuric Acid.
Mathieson & Hegeler Zinc Co. La Salle, Ill.

Tacks, Brads, Staples, &c.
Atlas Tack Corporation. Boston, Mass.
Cobb & Drew. Plymouth, Mass.
Grand Crossing Tack Co. Grand Crossing, Ill.
Nat. Screw & Tack Co. Cleveland, O.
Phillips, E. & Sons. South Hanover, Plymouth Mills, Plymouth, Mass.
Trufant, W. E. Whitman, Mass.

Taps and Dies.
Eutterfield & Co. Derby Line, Vt.
Carpenter, J. M. Tap & Die Co., Pawtucket, R. I.

Tapping, Maxwell & Moore. 111 Liberty St., N. Y.

Wells Bros. & Co. Greenfield, Mass.

Wiley & Russell Mfg. Co. Greenfield, Mass.

Testing Laboratories.
Riehle Bros. Testing Mch. Co. Philadelphia.

Testing Machines.
Riehle Bros. Testing Mch. Co. Phila.

Theoretical Hardware.
Wollensak, J. F. Chicago, Ill.

Thill Springs.
Thill Spring Co. Boston, Mass.
Sabin Machine Co. Montpelier, Vt.

Time Record.
Scattergood, H. W. Phila., Pa.

Timbers' Hardware.
Berger Bros. Philadelphia, Pa.

Tinning Process.
Sands, Thomas. Nashua, N. H.

Tin Plate Machinery.
Lloyd Booth Co. Youngtown, Ohio.

Tinware.
Am. Stamping Co. 104 & 106 John St., N. Y.

Tire Upsetters.
Butts & Ordway. Boston, Mass.

Toe Calks, Steel.
Burke, F. F. Boston, Mass.

Tool Chests.
Am. Tool Co. 200 W. Houston St., N. Y.

Tools.
R. H. & Co. New Haven, Conn.
Chaurell Tool Co. Reading, Pa.
Frasse Co. 19 Warren St., New York.
Fray, Jno. S. & Co. Bridgeport, Conn.
Mayhew, H. H. Co. Shelburne Falls, Mass.

Millers Falls Co. 93 Reade, N. Y.

Richardson, C. F. & Son. Athol, Mass.

Standard Tool Co. Athol, Mass.

Stanley Rule & Level Co. 29 Chambers, New York.

Tower & Lyon. 95 Chambers St., N. Y.

Tools, Blacksmith and Wheelwrights.
Buffalo Forge Co. Buffalo, N. Y.
Butts & Ordway. Boston, Mass.
Champion Blower & Forge Co. Lancaster, Pa.
Plumb, Fayette R. Philadelphia, Pa.
Wiley & Russell Mfg. Co. Greenfield, Mass.

Tools, Steam and Gas Fitters'.
Saunders' Sons. D. Yonkers, N. Y.

Torches, Oil and Gasolene.
Danzler Stove & Mfg. Co. Cleveland, O.
Schneider & Trenkamp Co. Cleveland, Ohio.

Transom Lifters.
Wollensak, J. F. Chicago, Ill.

Tree Protectors.
McCallip Fence & Wire Wks. Columbus, Ohio.

Trucks, Manufacturers of.
Berger Bros. Philadelphia, Pa.
Boston & Lockport Block Co. Boston, Mass.
Clark, G. F. Windsor Locks, Conn.
Lansing Wheelbarrow Co. Lansing, Mich.

Tubes, Seamless Drawn Copper.
Ansonia Brass & Copper Co. 19 and 21 Cliff, N. Y.

Randolph & Clowes. Waterbury, Conn.

Tubes, Steel.
Leng's John S. Son & Co. 4 Fletcher St., New York.
Manassam Tube Co. Ltd. Landore, England.
Shelby Steel Tube Co. Shelby, O.

Tumbling Barrels.
Henderson Bros. Waterbury, Conn.

Turbine Buckles.
Central Iron & Steel Co. Brazil, Ind.
Cleveland City Forge & Iron Co. Cleveland, O.

Merrill Bros. Brooklyn, E. D.

Twist Drills, Makers of.
Cleveland Twist Drill Co. Cleveland.
Morse Twist Drill & Machine Co. New Bedford, Mass.
New Process Twist Drill Co. Taunton, Mass.
Standard Tool Co. Cleveland.

Valves, Gas, Water and Steam.
Best, Fox & Co. Pittsburgh, Pa.
Chapman Valve Mfg. Co. Boston.
Eyon-Evans Mfg. Co. Philadelphia, Pa.

Jenkins Bros. 71 John, N. Y.

McNab & Harlin Mfg. Co. 55 John N. Y.

Mason Regulator Co. Boston, Mass.

Ventilating Fans.
Huvett & Smith Mfg. Co. Detroit, Mich.

Ventilator Appliances.
Howard & Morse. 45 Fulton, N. Y.

Vise Jaws.
Newark Mch. Tool Co. Newark, N. J.

Vices.
Capital Mch. Tool Co. Auburn, N. Y.
Hollands Mfg. Co. Erie, Pa.
Howard Iron Works. Buffalo, N. Y.
Millers Falls Co. 93 Reade St., N. Y.
Prentiss Vice Co. 44 Barclay St., N. Y.
Tower & Lyon. 95 Chambers St., N. Y.
Van Wagoner & Williams Co. 14 Warren St., N. Y.

Wagon Jacks.
Boston & Lockport Block Co. Boston, Mass.
Lockport, N. Y.
Covert Mfg. Co. West Troy, N. Y.
Covert's Saddlery Works. Farmer, N. Y.

Washers.
Haskell, Wm. H. Co. Pawtucket, R. I.
Hilton Mfg. Co. Milton, Pa.
Sternbergh, J. H. & Son. Reading, Pa.

Washing Machines.
Wm. E. Cowan Ind. Steam Mfg. Co. Connersville, Ind.
Wayne, A. Mfg. Co. Ft. Wayne, Ind.

Water Meters.
Worthington, B. Henry R. 86 & 88 Liberty St., N. Y.

Water Wheels.
P. Ole. Robt. & Son Co. Baltimore, Md.

Well Machinery.
Amer. Well Works. Aurora, Ill.

Wheelbarrows.
Akron Tool Co. Akron, O.
Amer. Steel Scraper Co. Sidney, Ohio.
Cockburn Barrow & Mch. Co. Jersey City, N. J.
Kilbourne & Jacob Mfg. Co. Columbus, Ohio.
Toledo Wheelbarrow Works. Toledo, O.

Lansing Wheelbarrow Co. Lansing, Mich.
Stander Steel Scraper Co. Sidney, O.
Sweet Mfg. Co. Minneapolis, Minn.

Wheels.
Arnold Metal Wheel Co. New London, Ohio

Whips.
American Whip Co. Westfield, Mass.

Window Cord, Makers of.
Samson Cordage Works. Boston, Mass.

Wire, Manufacturers of.
Amer. Spiral Spring Co. Pittsburgh, Pa.
Consolidated Steel & Wire Co. St. Louis, Mo.

Gautier Steel Department of Cambria Iron Co. Johnstown, Pa.

Miller & Van Winkle. Brooklyn, N. Y.

New Castle Wire Nail Co. New Castle, Pa.

New Haven Wire Mfg. Co. New Haven, Conn.

Prentiss, Geo. W. & Co. Holyoke, Mass.

Salem Wire Nail Co. Salem, N. J.

Trenton Iron Co. Trenton, N. J.

Washburn & Moen Mfg. Co. Worcester, Vt.

Wetherell Bros. 93 Liberty St., N. Y.

Wolfe, R. H. & Co., Ltd. 118th St. and Harlem River, N. Y.

Wright & Colton Wire Cloth Co. Worcester, Mass.

Wire Cloth.
Barnum, E. T. Detroit, Mich.
Clinton Wire Cloth Co. Clinton, Mass.
Darby, Edward & Sons. Philadelphia.
Estey, W. S. 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co. 43 Cliff, N. Y.
Howard & Morse. 45 Fulton, N. Y.
N. J. Wire Cloth Co. Trenton, N. J.
Reliance Wire & Iron Wks. Milwaukee, Wis.
Scheeler & Sons. Buffalo, N. Y.
Wickwire Bros. Cortland, N. Y.
Wright & Colton Wire Cloth Co. Worcester, Mass.
W. S. Tyler Wire Works Co. Cleve'd.

Wire Cutters.
Cronk Hanger Co. Elmira, N. Y.
King, J. M. & Co. Watertown, N. Y.

Wire Dies.
McFarland, Wm. Trenton, N. J.
Newton & Shipman. 83 John, N. Y.

Wire Door Mats.
Hartman Mfg. Co. Elwood City, Pa.
Horrocks, Joshua. 45 Cliff St., N. Y.
The Wire Goods Co. Worcester, Mass.

Wire Fences.—See Fencing, Iron and Wire.

Wire Goods, Manufacturers of.
Darby, Edward & Sons. Phila.
Gilbert & Bennett Mfg. Co. 42 Cliff St., N. Y.

Lange Fence & Wire Co. St. Louis, Mo.

Ludlow-Saylor Wire Co. St. Louis.

Osawamie Mills Co. Northfield, Conn.

Scheeler & Sons. Buffalo, N. Y.

Whitman & Barnes Mfg. Co. Syracuse, N. Y.

Wire Goods Co. Worcester, Mass.

Wickwire Bros. Cortland, N. Y.

Williamson, C. T. Wire Novelty Co. Newark, N. J.

Wire Machinery.
Am. Tool Wks. Cleveland, O.
Manville, E. J. Mch. Co. Waterbury, Ct.
Morgan Construction Co. Worcester, Mass.

Waterbury Mch. Co. Waterbury, Conn.

Wire Straightening and Cutting Machinery.
Adt, John & Son. New Haven, Conn.

Wire Nails.
Consolidated Steel & Wire Co. St. Louis, Mo.
Indiana Wire Fence Co. Crawfordsville, Ind.

Kilmer Mfg. Co. Newburg, N. Y.

New Castle Wire Nail Co. New Castle, Pa.

Phillips, E. & Sons. South Hanover, Mass.

Phillips, Townsend & Co. Phila., Pa.

Plymouth Mills. Plymouth, Mass.

Salem Wire Nail Co. Salem, Mass.

Taunton Wire Nail Co. Taunton, Mass.

Whitney, A. & Co. New York, N. Y.

Wire Rops, Steel.
Consolidated Steel & Wire Co. St. Louis, Mo.

Illinois Steel Co. Chicago, Ill.

New Castle Wire Nail Co. New Castle, Pa.

Washburn & Moen Mfg. Co. Worcester, Mass.

Whitney, A. R. & Co. 17 B'way, N. Y.

Wolfe, R. H. & Co., Ltd. 118th Street and Harlem River, N. Y.

Wire Rope, Iron and Steel Makers.
Broderick & Bascom Rope Co. St. Louis, Mo.
California Wire Works. San Francisco, Cal.
Hazard Mfg. Co. Wilkesbarre, Pa.
Lechen & Sons Rope Co. St. Louis.

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Bass Foundry & Machine Works.	40	Cheney, S. & Son.	27	Ette & Henger Mfg. Co.	122	Houston, C. B. & Co.	50
Belden Machine Co.	53	Chess Bros.	27	Etting, Edw. J.	20&28	Howard Iron Works.	116
Bell, Geo. E.	59	Chester Steel Casting Co.	28	Eureka Cast Steel Co.	132	Howard & Morse	7
Bellevue Pump Co.	77	Christy Knife Co.	88	Eynon-Evans Mfg. Co.	38	Howson & Howson	6
Bement, Miles & Co.	55	Chrome Steel Works.	26	F. & N. Mfg. Co.	121	Hulbert Bros. & Co.	131
Bemis & Call Hardware & Tool Co.	116	Church, Isaac	124	Fairmount Machine Co.	63	Hunt, Robert W. & Co.	66
Berger Bros.	116	Church & Sleight	40	Fearing, Wm. S.	2	Hurley Bros.	53
Berlin Iron Bridge Co.	11	Cincinnati Corrugat'g Co.	7	Ferdinand, L. W. & Co.	95	Hussey, E. J. & Co.	70
Bertsch & Co.	49	Cincinnati Mfg. Co.	103	Ferracuta Machine Co.	51	Huyett & Smith Mfg. Co.	53
Best, Fox & Co.	44	Cincinnati Milling Mch. Co.	65	Field, Alfred & Co.	84	Ideal Mfg. Co.	95
Bethlehem Iron Co.	24	Claffen Mfg. Co.	45	Fitch, W. & E. T.	131	Illinois Pure Aluminum Co.	103
Beyn Bros. Mfg. Co.	94	Clapp, Geo. M.	68	Fitchburg Machine Works	55	Illinois Steel Co.	23
Bickford Drill & Tool Co.	62	Clark, H. P.	120	Fitzgerald, S. C.	6	Indiana Bicycle Co.	94
Bicycle Step Ladder Co.	104	Clark & Cowles	6	Fitzsimons & Co.	20	Indiana Wire Fence Co.	3
Bigelow, C. R.	68	Clark Mfg. Co.	95	Flag, Stanley G. & Co.	132	Ingersoll Milling Machine Co.	55
Biggall & Keeler Mfg. Co.	50	Cleveland Block Co.	109	Foley, J. W. & Co.	65	Ives, H. B. & Co.	116
Billings & Spencer Co.	116	Cleveland City Forge & Iron Co.	1	Forehand Arms Co.	96	Jacobus, W. H.	124
Billington, J. H. & Co.	38	Cleveland Novelty Co.	77	Fram, E. T.	107	Jarecki Mfg. Co.	54
Bingham, W. Co.	95	Cleveland Rubber Works	87	Frankford Steel Co.	22	Jeffrey Mfg. Co.	44
Birmingham Iron Foundry	27	Cleveland Stamping & Tool Co.	101	Fraser Co.	75	Jenkins Bros.	1
Bissell, E. Son & Co.	70	Cleveland Stone Co.	65	Fray, Jno. S. & Co.	99	Jenkins & Lingle	53
Blake & Johnson	13	Cleveland Twist Drill Co.	80	Frost Thill Spring Co.	109	Jenner, H. W. T.	6
Bliss Co., E. W.	46	Clinton Wire Cloth Co.	8	Fulton Iron & Engine Works	62	Jessop, Wm. & Sons	21
Boardman, L. & Son	94	Cobb & Drew	7	Fulton Steam Boiler Wks & Foundry	39	Johns, H. W. Mfg. Co.	13
Bogert, John L.	65	Cockburn Barrow & Machine Co.	120	Gardner, Jas. & Son	28	Johnson Foundry Co.	29
Boker, Hermann & Co.	21	Coes, Loring & Co.	117	Garrison, A. Foundry Co.	27	Johnson, I. G. & Co.	132
Boone, W. C. Mfg. Co.	29	Coes Wrench Co.	117	Garry Iron Roofing Co.	122	Johnson, I. H., Jr. & Co.	62
Booth, The Lloyd Co.	30	Coffin & Leighton	54	Garland Foundry Co.	30	Johnson, S. C.	101
Borden & Lovell	6	Colburn, A. M.	50	Garvin Machine Co.	64	Jones, B. M. & Co.	54
Borgner, Cyrus	30	Colby Wringer Co.	104	Gautier Steel Department	18	Jones, Jesse & Co.	82
Boss Mfg. Co.	120	Coldwell Lawn Mower Co.	121	Gay & Parsons	99	Jones & Lamson Machine Co.	72
Boston Bridge Works	18	Coillau, Victor	30	Gaylord, F. L. Co.	3	Kayser, Ellison & Co.	21
Boston Gear Works	41	Conroy, P. J. & Co.	109	Gendron Iron Wheel Co.	94	Keeley, Jerome & Co.	20
Box, Alfred & Co.	62	Consolidated Steel & Wire Co.	17	Gilbert & Bennett Mfg. Co.	8	Kelley & Woolworth	84
Boyce Rivet Co.	132	Continental Iron Works	60	Glazier Stove Co.	73	Kelly, Daniel	63
Bradlee & Co.	19	Copeland & Bacon	42	Gleason Tool Works	41	Kennedy, Julian	32
Bradley Fertilizer Co.	51	Corning, Edw. & Co.	19	Goodell Co.	86	Keuffel & Esser Co.	83
Brass Goods Mfg. Co.	2	Cotton, Barclay W. & Co.	19	Goodell, J. W.	97	Keyless Lock Co.	107
Bridgeport Chain Co.	87	Coulter & McKenzie Machine Co.	55	Goubert Mfg. Co.	38	Keys, W. W. & R. M. Co.	131
Bridgeport De-oxidized Bronze & Metal Co.	2	Covert Mfg. Co.	111	Gould & Eberhardt	45	Keystone Clutch & Machine Works	53
Bridgeport Gun Implement Co.	60	Covert's Saddlery Works	73&112	Graham, John H. & Co.	100	Keystone Mfg. Co.	75
Briggs, Marvin	68	Cox, Justice, Jr.	24	Grand Crossing Tack Co.	12	Kilbourne & Jacobs Mfg. Co.	119
Bristols' Mfg. Co.	1	Cramp, Wm. & Sons S. & E. B. Co.	3	Grand Rapids Hand Screw Co.	83	Kilmer Mfg. Co.	9
Britton, J. Blodgett	32	Crescent Horse Shoe & Iron Co.	114	Grant Anti-Friction Ball Co.	54	King, J. M. & Co.	82
Broderick & Bascom Rope Co.	6	Crescent Phosphorized Metal Co.	3	Grant Corundum Wheel Mfg. Co.	58	Knapp & Cowles Mfg. Co.	110
Bronson Supply Co.	97	Crescent Steel Co.	23	Great Western Pin Co.	62	Koch, A. B. & Co.	97
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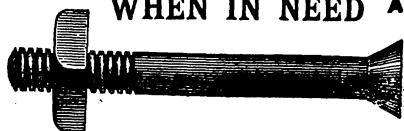
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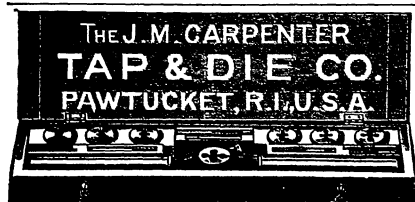
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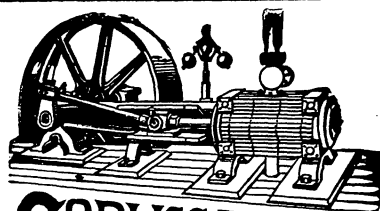
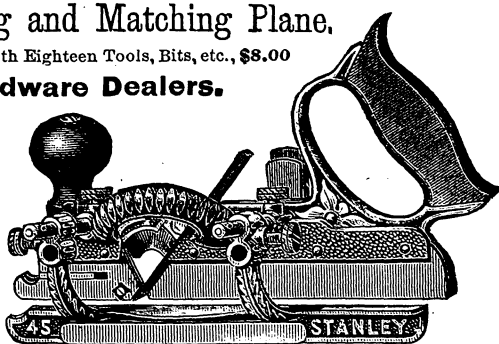
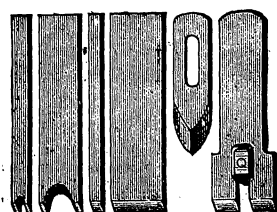
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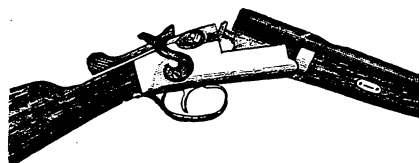
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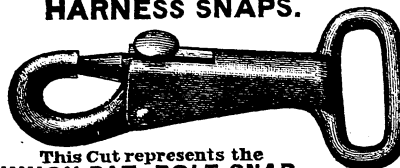
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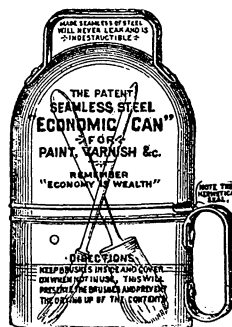
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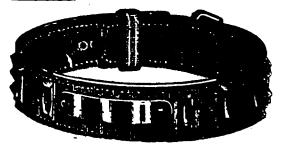
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THE IRON AGE

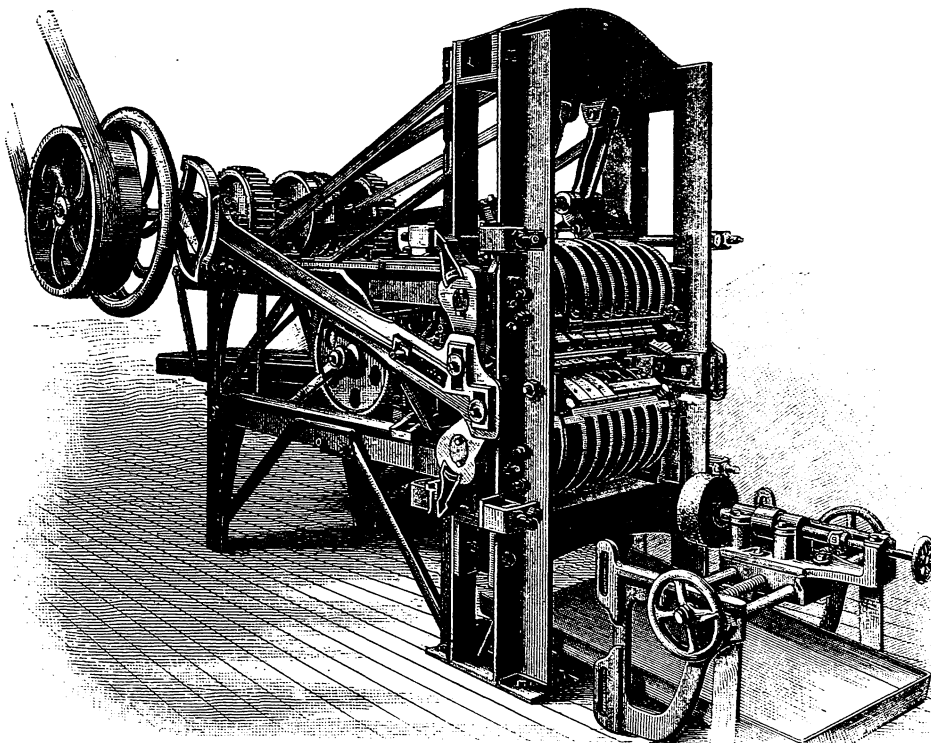
THURSDAY, SEPTEMBER 7, 1893.

The Severance Cut-Nail Machine.

A novel machine for the manufacture of cut nails is shown in operation at the World's Fair in Chicago. It is the invention of W. N. Severance and is located in Machinery Hall, Column B 51. There are a number of very interesting points in connection with this machine, which has been devised for the purpose of enabling the cut nail to compete with the wire nail. It is automatic in its operation, dispensing entirely with the skilled nailer and his

Arsenal at Watertown, Mass., in December last during the great test of cut and wire nails. The Severance nail was at first ruled out because it was not a regular nail as to its shape. The inventor said he would wait and "play with the winner." When his nails were tested, the following results were obtained: Holding power 3d nails in white pine, head driven within $\frac{3}{8}$ inch of wood—wire nail, average, 21 pounds; cut nail, average, 23 pounds; Severance nail, average, 53 pounds. The head was tested by driving nails through a piece of the same pine $\frac{3}{8}$ inch thick until the heads were flush. The nails were then pulled through the

to pin guides of the cutter head, all firmly held in position in two separate cutter heads. The adjustment of the knives is done by operating set screws which bear on the face and back of each knife. In case of a broken knife it can be removed and another put in place instantly—without being delayed by any new adjustment—by simply loosening the retaining set screws, taking the broken knife out, setting the other in and tightening the set screws. As the adjusting set screws are not disturbed, the adjustment is retained. A simple automatic grinding apparatus is provided, which grinds the knives while in position in the machine. The



THE SEVERANCE CUT-NAIL MACHINE.

acquired manual dexterity. Like the wire-nail machine, it merely requires the services of an attendant to feed several and the oversight of a competent mechanic to keep a number of machines in order and change their adjustment. It is a multiple cutter, producing several nails at a stroke, their number depending upon their size. The nail plate is fed in long sheets, from which the nails are cut transversely. The nails can be cut cold or hot, the inventor having devised a heating apparatus for gas or oil by which the plate is heated as it passes through the machine.

The nails made are different in appearance from the ordinary cut nail, as they have a chisel point and the head is not "upset," but merely cut larger than the body on two sides, the whole nail on two other sides being of the same thickness from head to point. There is no waste of metal in cutting, as the heads alternate with the points. As the heads are not "upset" they cannot fly off in driving, while they pull equally well with the ordinary nail. These nails were tested at the United States

piece at 54 pounds. The heads of some were then completely filed off, and the average force required to pull them through was $40\frac{1}{2}$ pounds. As compared with wire nails of the same size, the Severance nails run from 10 to 20 per cent. more to the pound than wire nails.

The weight of the nails can, however, be regulated so as to be whatever may be desired, by varying the thickness of the plate.

The patents on the machine are owned by the Severance Nail Machine Company of Duluth, Minn., of which A. M. Stearns is manager.

Description of Machine.

Before describing the chief points of the construction of the machine we will mention its principal characteristics. The knives or cutters, when properly tempered, are not liable to break and are durable, as the cut is a comparatively slow one and is a direct vertical motion. Each series of cutting knives are guided in their motion by two large socket guides which are fitted

whole sheet of plate is fed directly and automatically by a ratchet and roll motion, without any skips or waste material. The succeeding sheet is riveted to the sheet being cut, without any stopping of the machine or losing time. One set of guides and knives is being oiled automatically while the opposite set is cutting. With a plate $20\frac{1}{2}$ inches wide the machine will cut 16 3d nails at each stroke, make two strokes at each revolution and 50 revolutions per minute, or at the rate of 1600 revolutions per minute.

The frame of the machine is formed like a truss and is very strong and unyielding under the oscillation of the cutting stock and the impact of the cutters, and sustains the operative parts in an accessible and convenient manner, affording great facility for inspection and repairs. The uprights are bolted to the lintel and sill and can be readily removed by loosening the nuts l , for the purpose of removing one or both of the cutter stocks without disturbing the other parts of the machine. In this way one machine can be readily adapted

to cutting several different sizes of nails. This interchangeability of the cutter stocks enables a great saving of capital to be effected, because with five of these machines all the 35 sizes of nails now used in the market can be made, instead of requiring a separate machine for each two or three sizes. The feed has to be changed with each change of the machine to cut different sizes of nails, but this is easily effected by changing the feed ratchet wheel or by adjusting the stroke of its driving pawl, as will be readily understood.

The lower or bed knives are mounted in an oscillating bed cutter stock, B, which is journaled in stationary boxes or bearings between the uprights *a b*, and is operated from the main shaft by the shift bars *r* and cranks *g*. It has two sets or gangs of knives, *E E'*, Fig. 5, which are brought alternately into a cutting position by its oscillating movement to operate with similar sets or

When the cutting stock C has completed its oscillation and brought one gang of knives in position to make a cut it is caused to descend by the operation of the toggle *u t*, and as it does so the guides, which project from the lower face of the stock at the ends of the channel in which the gang of knives is secured, enter guideways or recesses formed in the inner edges of side bars or bridges, which extend one on each side between the uprights *a b*. One of these bridges is shown in elevation in Fig. 5. The guideways or recesses are provided with adjustable gibs, which are held in position by cap bolts, and are adjustable by means of metallic liners placed between the jaws and the gibs. The position guides and the guiding recesses can be adjusted with absolute precision so as to insure the knives making a perfect cut. It will be understood that there are two of the guides for each gang of cutting knives

starting and stopping of the same, it is very desirable to secure the minimum weight combined with the necessary strength, as thereby the durability of the machine is greatly increased.

The cutters *E E'* are formed exactly alike except that the alternate ones are thinner than the others by a distance equal to one-half the width of the head of the nail, the object being to provide for cutting the head of the nail by one stroke of the machine, since if the knives were of uniform thickness the head would be formed by two strokes, causing imperfect heads. The knives are arranged relatively to each other as shown in Fig. 4, in which the end knives have the greatest projection from the stocks and the central knives the least, the intermediate ones receding gradually. The object of this arrangement is to cause the sheet to be first engaged at the edges by the cutters so as to hold it straight and pre-

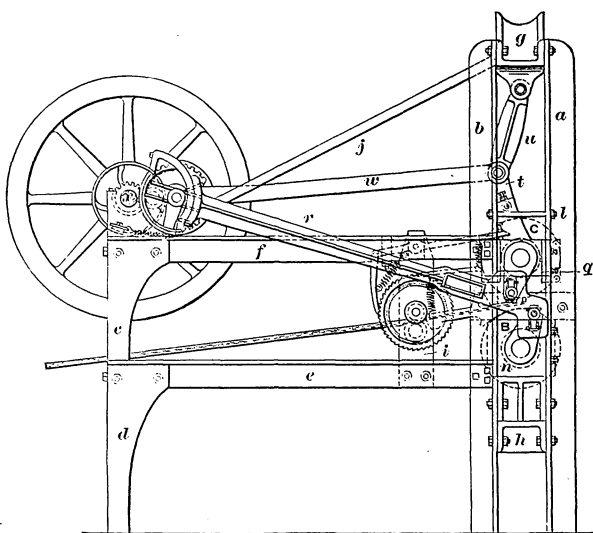


Fig. 2.—Side Elevation.

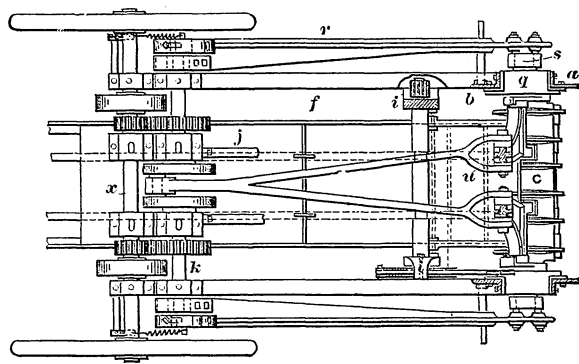


Fig. 3.—Sectional Plan.

THE SEVERANCE CUT-NAIL MACHINE.

gangs of knives on the upper or reciprocating cutter stock in acting on the nail plate.

The reciprocating and oscillating or cutting knives are mounted in an oscillating and reciprocating cutter stock, C, which is journaled in sliding boxes between the uprights *a b*, and is oscillated by means of the shift bars *r* and cranks *g*, and reciprocated by the toggle levers *u t*, which in turn are operated from the main shaft by a crank and the connecting rod *w*. The cutter stock C is provided with two sets of guides, whereby it is guided in its reciprocating movement with extreme accuracy so that safety to the knives and the production of perfect nails are insured.

The operating mechanism is mounted on the rear end of the horizontal bars *a*. It consists of a power shaft, *x*, which is driven by pulleys and is regulated by the fly wheels shown. The main shaft *k* is driven by it by means of gearing. This shaft operates the toggle *u t* by means of the crank shown in Fig. 3 and the connecting rod *w* and oscillates the stocks B and C by means of cam yokes, cams and the shift bars *r*. The rolls for feeding the sheet are journaled in the vertical side pieces *i*, and are operated by a lever and pawls to give an intermittent feed to the sheet during the retraction of the cutting stock C.

and that they are alternately brought in position over the guideways or recesses.

The second set of guides consists of pin guides on the bed stock B and corresponding socket guides on the cutting stock C. There are four socket guides on the cutting stock C, each one arranged in the end of a knife channel or just inside of the position guide. The corresponding four pin guides are placed in the ends of the knife channels of the bed stock B in a position corresponding to that of the socket guides in the cutting stock C, so that when the latter descends in making a cut the pins on the guides will enter the recesses.

The knives *E E'* are flat rectangular pieces of steel with beveled cutting edges, and have an end cutting outline conforming to the shape of the nail to be cut. They are secured in the stocks in the manner shown in the drawings, each stock being provided with two channels in which the knives are held. The knife stocks are formed with annular strengthening flanges, which impart rigidity to the sides of the channels, thereby avoiding all springing of the same and the consequent displacement of the cutters and the production of imperfect nails. This is a matter of great importance, because, owing to the necessary weight and the rapid motions of the knife stocks, involving the quick

vent it from buckling as the cut proceeds.

The toggle levers *u t* are provided with working arms having shoes which bear on shoulders of the cutting stock C and the impinging faces of the shoes and shoulders are concentric. These are the devices by which the toggle forces the cutter stock to descend in making a cut. The toggle lever is also provided with lifting arms having stirrups which embrace trunnions of the cutting stock C and thereby raise it.

The upward movement of the cutting stock preceding each cutting stroke is utilized for the purpose of feeding the nail sheet to the cutters. The nail sheet is as wide as the gangs of cutters and of any desired length. It may be made up of a number of pieces or sheets fastened to each other by means of cleats and rivets, which can be riveted together upon the feed rack as the machine is running. The annular grooves in the feed rolls permit the passage of these cleats and rivets between them without obstruction.

The position of the machine being that shown in Fig. 5, when the downward motion has been completed and a series of nails cut from the sheet, its operation is as follows: The upward reciprocating motion of the cutting stock C disengages the pin and socket guides and releases the position guides

from the bridges, when the sheet is fed into the machine the proper distance by means of the ratchet wheel and feed rolls. As the cutter stock B is oscillated into position for the succeeding cut the forward end of the sheet rack is lifted to permit the knives E' to swing under the sheet, which descends to its original position as the knives reach their cutting position, placing the end of the sheet upon the bed knives ready for the action of the cutting knives. When the toggle begins to straighten the shift or oscillation has been completed and the position guides of the knives E' are now vertically over the guideways or recesses in the bridges, and guided by the pins in the upper slots of the shift bars r they enter the recesses, and the cutting stock is then brought to an exact position for making a cut with the knives E'; the bed stock B is also shifted

does away with one of the most difficult and expensive operations in the working and maintenance of machines for cutting nails.

The drawing, Fig. 6, shows how the nails are cut from a sheet without wasting any stock.

WORLD'S FAIR NOTES.

The W. F. & John Barnes Company

of Rockford, Ill., make an excellent exhibit in Machinery Hall, Section 14, Column J 36. In the arrangement of their exhibit they have introduced some novel features which attract a great deal of attention. In the center of the north front has been erected a circular column, with sufficient space inside for a spiral stairway, which leads to a cir-

pulleys. The disk is arranged at right angles with the pulleys so that their faces touch the side of the disk. A lever brings the disk up in loose or tight contact, and another lever shifts the driving pulley near the rim or toward the center of the disk, thus regulating the speed easily and instantly without interfering with the progress of the work. The feed is arranged with a friction disk in the same way, the reverse motion being attained by simply pushing the lever beyond the center. This device has been thoroughly tested by the company and they are now putting the machine on the market. The lathe will do any ordinary work up to a $\frac{1}{2}$ -inch cut. Next is a line of velocipede foot-power lathes for metal working. These are of different sizes, including Nos. 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$ and 6. These lathes can be fitted with a countershaft for steam or motor

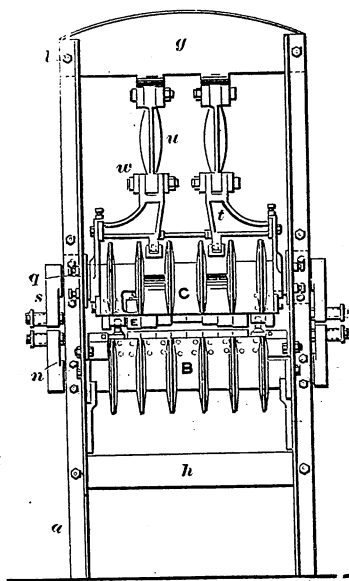


Fig. 4.—Front Elevation.

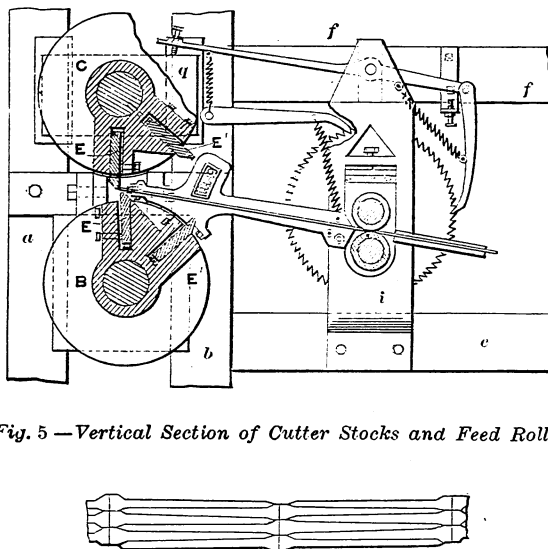


Fig. 5.—Vertical Section of Cutter Stocks and Feed Rolls.

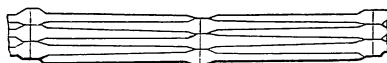


Fig. 6.—Drawing Showing How the Nails are Cut from the Sheet.

THE SEVERANCE CUT-NAIL MACHINE.

at the same time and held in position by its pins in the lower slots, so that on the further descent of the cutting stock the pin and socket guides shall engage each other and bring the bed stock into exact and unyielding position for the cut. At this instant the cutting knives engage the projected sheet and a series of nails are cut and fall on the receiving apron, and at the backward or next movement of the stock are cast off. The next oscillation of the machine returns the parts to the position shown in Fig. 5 ready to make a cut with the knives E.

It is of the utmost importance to keep the guides and knives well oiled. This is accomplished by a line of sponges so mounted that they engage the cutting edges of each gang of knives and the ends of the guides in their descent as the other gang of knives is making a cut.

The grinding attachment, which is shown detached in the perspective view, is arranged to be bolted to the uprights a of the frame. Before grinding the cutters they are projected to a line so as to grind uniformly. By means of this appliance the knives can be quickly and accurately ground, and as they are not removed there is no time lost in replacing and readjusting them. This device

cular platform 14 feet in diameter. This platform makes a good observatory and resting place. Grouped round this structure are metal-working machines, both foot and steam power. These consist of a row of drill presses, from a sensitive drill up to a 42-inch swing and a three-spindle drill. These are all of the company's latest patterns. On the 20 inch drill is a new self-feed, brought out this year. It is quite a novelty in so small a drill, but is found to be just what many machinists want. All these drill presses are shown in operation. At the top of each spindle is a revolving sign with "Barnes" on one side and "drills" on the other. Back of these presses is a complete line of foot-power wood-working machinery, such as scroll saws, mortises, tenoning machines, formers, self-feeding hand-ripping machines, and the Barnes combination machine. The last named includes a cross-cut and rip saw, a boring attachment, and a scroll saw. On the mandrel also can be placed cutter heads for cutting grooves, dados, rabbets and joints for boxes and drawers, &c. Next in order comes a new 16-inch friction lathe, in which the usual cone for different speeds is replaced by a friction disk, which operates in contact with leather covered

or with treadle motion. Sales have been made since the exhibit was in place for export to Egypt, Germany and South America.

The Canedy-Otto Mfg. Company

of Chicago Heights, Ill., are located in Machinery Hall, Section 13, Column I 38. They make an exhibit of portable forges, blacksmiths' blowers and ever-ready screw plates. The largest forge shown has a $33\frac{1}{2} \times 46$ inch hearth, and is claimed to be the largest portable forge in the world. From this the display runs down to an 18-inch hearth. The large forges are equipped with hand levers and are also arranged for power. The blowers are equipped with both levers and cranks, each movement being independent of the other. The clutch used in connection with the hand lever is of a new pattern, wholly original with this company. It consists of three compound levers attached to a flat steel plate. These levers are operated by the shaft of the blower handle, which passes through the plate. A flanged plate attached to the fan shaft surrounds the lever plate, so that the levers instantly press against the rim when the handle is pushed down and are withdrawn when the handle is raised. There is almost no lost motion and absolutely no

noise or friction, as there is no ratchet. The grip of the clutch is wonderfully tight, and to slip seems to be an impossibility. The blacksmiths' blowers have substantial steel frames, solid brass bearings and are made to endure hard service. A showcase contains a good display of the company's ever ready screw plates. A leading feature of these screw plates is that each die has its own stock and guide already adjusted to suit the tap. In this way the stock corresponds with the work to be done, and a stock heavy enough for a 1 inch cut is not used for a $\frac{1}{2}$ inch. The dies also are always ready for use and no time is lost fitting them in stocks. They need no adjusting nor changing, except for wear. They are made of the best material, hardened only on the cutting edges, so that they will not break with ordinary treatment, and are capable of cutting metal considerably over size with ease. These screw plates are highly finished and put up in sets of different series in neat cases, containing tap wrenches and the necessary adjusting tools. Specimens are also shown of farriers' knives, cold chisels and other specialties made by the company. They have recently removed to their new plant at Chicago Heights, where they have three times the capacity of their old works at Downer's Grove.

The E. Horton & Son Company

of Windsor Locks, Conn., make a very large and fine display of chucks in Machinery Hall, at Column K 52. They show, it is stated, the most extensive display, as well as the greatest variety of chucks at the exposition. They comprise chucks for all purposes, from car-wheel chucks down to small drill chucks. The car-wheel chucks comprise quite a number of specials for boring and turning odd sizes and patterns. The other chucks consist of independent, universal and combination chucks for every variety of work that can be mentioned. Among these is a new drill chuck for holding taper shank drills. This is a device which works perfectly. It consists of a solid piece of steel, bored out to receive the drill. Two jaws are inserted in the side. One jaw holds the drill square and keeps it from turning, while the other centers and holds it rigidly in place. This chuck can be used for other drills as well as taper shanks. The combination chuck has a new feature in its reversible jaw. This jaw is made with shoulders at both ends, which come down squarely on the face plate. The shoulders prevent the jaw from springing even in the slightest degree, and thus make it as substantial as a solid jaw. The arrangement of the company's display is such as to attract attention in itself. In the center of the space stands a column of chucks, gradually tapering in size from base to summit, on the top of which is the company's sign. Surrounding this are three similar but smaller columns, specimens of large car-wheel chucks, supported vertically, a showcase containing small tools, &c.

Armstrong Mfg. Company

of Bridgeport, Conn., make a comprehensive exhibit of pipe threading and cutting machinery at Column K 52, Machinery Hall. There are six power machines of various styles and sizes in operation, each having an adjustment with which they can be run by hand. They cut and thread from 1 to 6 inch pipe. The feature of these machines is the fact that the gears run in oil and are thoroughly covered up so as to

exclude all cuttings, adding very considerably to the life of the machine. The die is made upon the principle of the company's hand die, with a double taper, and is readily ground on an ordinary grindstone. It is adjustable to difference in fittings by reason of a cam which carries forward the knives to the required position. The cutter is automatic, being fed into the pipe by a star feed. The pipe is held in position by four jaws carried forward on a pair of cog wheels which are adjusted on opposite sides of the pipe. These jaws are hardened and may be replaced at very small cost in case of an accident. The company also exhibit a line of their regular hand machines for threading pipe from $\frac{1}{2}$ inch up to 4 inches. The hinged pipe vise is a convenient tool in a fitting shop, being instantly opened and closed. Pipe wrenches are another specialty, also three-wheeled pipe cutters. Nipple holders are shown which are intended to hold nipples securely while threads are being cut, and to release the nipples easily without injury to the newly cut threads. The holder is a tube threaded internally at both ends, each holder being thus adapted to two sizes of nipples. A slot runs through the tube lengthwise, in which is a taper key holding a loose plug. The threaded end of a nipple is screwed into the holder until it comes in contact with the plug. The other end of the nipple is then threaded and the key is driven back, which enables the nipples to be withdrawn by hand instead of being ruined by the use of pincers.

The Chas. Parker Company,

of Meriden, Conn., located in Machinery Hall, Section K 53, make an exhibit wholly confined to vises. Samples are shown attached to all sides of a heavy square table, in the center of which stands a series of shelves in pyramidal form to which other vises are fastened, while the top is finished in good shape with a very large model of a vise, having the working parts silvered and the frame in black. These vises are intended for the use of machinists, and cover all sizes called for in that branch of trade, some being provided with anvils, some mounted on plates so as to swing in any direction, others having long jaws, and many being specially fitted for holding pipe. The method of exhibiting the samples is well adapted to this class of goods, enabling them to be shown to best advantage and to be examined carefully in detail. The stand is of polished oak, with turned legs and polished brass corners.

Fisher & Norris

of Trenton, N. J., make a large exhibit of their Eagle anvils and Fisher double screw parallel leg vises in the same vicinity. The anvils shown comprise a great variety, embracing not only the familiar smiths' anvil with its horn, but special shapes in use in certain trades; some with square heads, others with convex heads, some with elliptical heads, &c. The sizes cover all kinds in use, from mammoths to others small enough for toys. A horseshoer's anvil is shown with a detachable vise, operated by the foot. A large saw anvil is shown which weighs 700 pounds. As an object of historical interest one of the Eagle anvils is exhibited which was first in use in 1848 by the Bush Hill Iron Works, Philadelphia. Another was used 17 years by Chas. S. Caffrey of Camden, N. J. Both are in excellent condition and good for many more years of service.

The Deming Company

of Salem, Ohio, have two exhibits of pumps and other hydraulic appliances. One is located in Machinery Hall, at Column K, No. 33, and the other in Horticultural Hall, north end, Column U, No. 74. The Machinery Hall exhibit is very extensive and interesting. Occupying a very conspicuous position, the company have availed themselves of the opportunity to catch the attention of the moving crowds by having numerous specimens of their pumps in action. Among these are rotary and double-acting pumps, while hand pumps are invitingly placed so as to tempt passers-by to try them to see how easily they work and the size of the stream they throw. Some of the pumps are fitted with glass cylinders, so as to display the action of the valves. Among the specialties shown in actual use is the hydraulic pump, intended for elevating water by hydraulic pressure, as, for instance, in filling tanks on upper floors when the city pressure is too weak to carry up the flow. In general construction it is similar to a steam pump. Improved hydraulic rams are also shown, with one of them at work elevating water. In addition to an imposing array of all sorts of pumps arranged on the floor, a pyramid has been built with numerous steps for the display of more rows of pumps. At the top of the pyramid is a tank into which streams of water are constantly pouring from the pumps below. Prominent among the samples of pumps shown in the general display are the Keystone non-freezing, double-acting force pump, which throws a continuous stream and is made for hand use or for operating with a wind mill, and the Torrent two-cylinder tank force pump, which throws a barrel a minute and may be used to put out fires or to fill wagon tanks for threshermen and others. The company also show their Little Giant hydraulic pressure test pump with which to determine the pressure strength of boilers, pipes, pump cylinders, &c., having a capacity up to 800 pounds per square inch. The working parts are made entirely of bronze. The exhibit in Horticultural Hall consists of pumps for spraying and other special uses peculiar to gardening. Wm. L. Deming is in charge of the company's exhibits. General Western agents are Henion & Hubbell, 55 and 57 North Clinton street, Chicago.

The Acme Machinery Company

of Cleveland, Ohio, exhibit a number of bolt and nut machines in operation at Column I 47, Machinery Hall. These comprise a $\frac{1}{2}$ -inch bolt heading, upsetting and forging machine, $\frac{1}{2}$ -inch back-gear six-spindle tapper, $\frac{1}{2}$ -inch double automatic bolt cutter, $\frac{1}{2}$ -inch single automatic bolt cutter, 1-inch rapid automatic double bolt cutter, 5-inch single bolt cutter with power feed attachment, 2-inch automatic taper threading machine and 2-inch power feed special threading machine. In the last named machine no change gears are used, but the lead screw is changed for each different pitch of thread, gearing direct from the spindle, making one revolution of screw to one of spindle, thus avoiding lost motion. Either right or left threads are cut on one lead screw. While the machine is convenient for rough turning, using milling dies in place of threading and the lead screw for power feed, such work is made complete as chair, letterpress, jack, vise and piano stool screws. It is also used for roughing lead screws for engine lathes and

for taps, or in fact any kind of screw work. It is claimed that the saving of labor on this machine is six to one as compared with the engine lathe. In the company's regular head machine all wearing parts are protected by hardened tool steel, and they make special claims for large end bearing for dies, quick adjustment of dies, a positive locking device, interchangeable dies, no springs in the head and the die ring connected directly with the barrel, which is of great importance to the bolt cutter. The machine for cutting taper thread is particularly adapted to working on thin pipe. In the rapid head-bolt cutter all four dies are adjusted together, and strong claims are made for the cheapness of dies and long life of head. With the Acme bolt header a perfect square or hexagon bolt head is made in from two to three blows, and it is claimed to have no equal for track bolts, rivets and upsets. All bearings are made of hardened and ground steel and bronze. It has a relief wedge positive in its movement, and no breakage of stock is caught between the dies. Double dies are used, by which more work can be accomplished with one heat than with single dies. The outside shear stock gauge, which gauges the stock in front instead of the rear, enables upsets, bolt heads, &c., to be made in any length of rod, avoiding welded ends. These machines are rapidly finding their way into railroad shops, especially where special efforts are being made to secure perfect interchangeability in the bolts and nuts used throughout the system. The exhibit has attracted much attention from foreign visitors, and numbers of them have gone to the works in Cleveland to see the machines in regular operation on all classes of work.

George H. Eaton & Co.,

10 Mount Washington avenue, Boston, make a very creditable exhibit of power presses and shears for working sheet metal at Column I 48, Machinery Hall. These machines are not shown in operation for lack of space. They comprise No. 2, No. 3, Nos. 4 and 5, No. 7 and No. 29 power presses, which are selected as fairly typical of the machines built by the firm for this class of work, although their complete line is by no means covered. The No. 2 is a small press with a bed opening of 4 x 5 inches, the No. 7 has a bed opening of 9½ x 12 inches and the No. 29 is an embossing press. A No. 31 drawing press is shown, with a 6½-inch opening in the bed and a 3-inch plunger. The screw presses exhibited are No. 4, with a bed opening 6 x 8 inches, and No. 45, of somewhat larger capacity. The shears comprise a No. 3 hand, with a 6-inch blade to cut ⅜ inch iron, a No. 40 slitting shears and a No. 39 geared power shears, which will cut ⅝-inch iron. Attached to a neat display board are a large number of specimens of work done on the firm's presses, comprising iron, steel, brass and copper sheet metal, cut in a great variety of patterns, as well as finely embossed designs, shallow and deep stamping, &c.

"El Cid," the new Morgan line steamer, sailed from New York, August 31, on her maiden voyage to New Orleans. "El Cid," which is one of the largest coastwise steam vessels afloat, is sister ship to "El Rio," both vessels having been built at the Newport News shipyard.

Tin-Plate Production.

Tin and Terne of Pittsburgh, in its issue of August 21, publishes returns from manufacturers of American tin

plates, which is perhaps 20 per cent less than the actual figures would show. Two of these firms use American black plates exclusively, two use imported plates exclusively.

Production of Tin and Terne Plates For the Quarter Ending June 30.

Company.	Tin plate.		Terne plate.		From American black plates.	From imported black plates.
	Lighter than 63 pounds per 100 square feet.	Heavier than 63 pounds per 100 square feet.	Lighter than 63 pounds per 100 square feet.	Heavier than 63 pounds per 100 square feet.		
	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.
United States Iron & Tin Plate Mfg. Company, Demmler, Pa.	816,697		447,333		1,264,030	
Indiana Tin-Plate Company, Atlanta, Ind.	192,304		191,984		386,288	
Wallace, Banfield & Co., Irondale, Ohio	1,719,789		250,978		1,970,767	
Locust Point Iron & Steel Works, Baltimore	727,507				727,507	
American Tin Plate Company, Elwood, Ind.	2,360,080		1,151,910		3,511,990	
American Tin & Terne Plate Company, Philadelphia			168,145	54,100	1,022,245	
Mathai, Ingram & Co., Baltimore	377,149	38,614			12,517	403,246
Sidney Shepard & Co., Buffalo, N. Y.*		22,526			22,526	
Norton Bros., Chicago	2,462,041				40,731	2,421,310
Apollo Iron & Steel Company			537,033	2,630	239,595	289,866
Cincinnati Corrugating Company, Piqua, Ohio			171,627	51,501	223,128	
McKinley Tin-Plate Company, Wilkinsburg, Pa.			117,355	104,016	221,371	
Baltimore Steel, Iron & Tin Plate Company, Canton, Md.	2,131,300					2,131,300
American Stamping Company, Brooklyn, N. Y.*	1,487,319	46,821,865**				48,309,184**
R. Wallace, Sons & Co., Wallingford, Conn.*		757,709			757,709	
Phillips Tin Plate Company, Philadelphia	235,500	38,800	299,808	45,500		619,608
Avery Stamping Company, Cleveland, Ohio*	17,000				17,000	
Norristown Tin Plate Company, Norristown, Pa.			2,701,626			2,701,626
Pittsburgh Tin Plate Company, New Kensington, Pa.						
John Hamilton, Pittsburgh			564,597		185,397	379,200
Griffiths & Cadwallader, Pittsburgh			367,480		249,423	120,057
Morewood Tin Plate Mfg. Company, Elizabethport, N. J.	2,818,463		1,949,832			4,768,307
N. & G. Taylor Company, Philadelphia	857,105		1,588,256		18,970	2,426,390
Record Mfg. Company, Conneaut, Ohio	625,363				201,175	424,188
A. A. Thomson & Co., New York			825,708			825,708
Laufman Tin Plate Company, Butler Junction, Pa.						
Gummey, Spering & Co., Philadelphia	68,123		563,950	97,560	631,510	
			630,478		221,052	477,549

* Stamping works.

** Evidently an error.

and terne plates for the three months ending June 30. The statement is made that the figures are duplicates of those made in the sworn official returns to Ira Ayer, special agent of the Treasury. We have tabulated the figures as above.

Tin and Terne states that three firms, who do not desire their names mentioned, produced 1,557,153 pounds of terne plates lighter than 63 pounds, and 114,994 pounds of tinned plate, in the production of which 1,606,605 pounds were from American and 65,542 pounds from imported black sheets.

Four firms known to have produced with regularity during the entire quarter have chosen to withhold reports. These are Merchant & Co., Philadelphia; Kahn Bros., New York; the Columbia Tin Plate Company, Piqua, Ohio, and the St. Louis Stamping Company, St. Louis. Estimating their production from the known capacity of their plants and the reports previously made, we put it in round figures at 2,750,000 pounds of tinned and terne

Summarized, the totals give the following exhibit:

	Lighter than 63 pounds to 100 sq. ft.	63 pounds to 100 sq. ft. and heavier.
Tinned plates.	17,010,536	904,470
Terne plates.	15,286,447	355,507
Estimated production of tin and terne plates of four firms making no returns.	32,296,983	1,259,977
Made from American black plates.	15,667,219½	
Made from imported black plates.	20,662,516½	

The total weight of all plates tinned, irrespective of weights per 100 square feet, is 36,306,980 pounds, nearly 45 per cent. of which were from American black plates.

Automatic Valve Gear for Blowing Engines.*

BY JAMES C. BROOKS,
President Southwark Foundry & Machine
Company, Philadelphia.

Owing to the large cost of maintenance of blowing engines for Bessemer

of such machines, engineers have given much thought to the design of some device to reduce the repairs and liability to accidents, and at the same time increase the efficiency of engines of this class.

With the exception of the old-fashioned flap-leather valve, it has been almost universally the custom to use various modifications of the mushroom valve, which are actuated in one direc-

these valves have at times been made very small. In doing this the area of the valve openings is greatly reduced, and the consequent friction raises the temperature of the air very much. For this reason the density of air actually delivered to the cylinder is less than it would be if allowed to enter more freely. Even with the larger valves of this type the tortuous passage of the air as it enters the cylinder creates con-

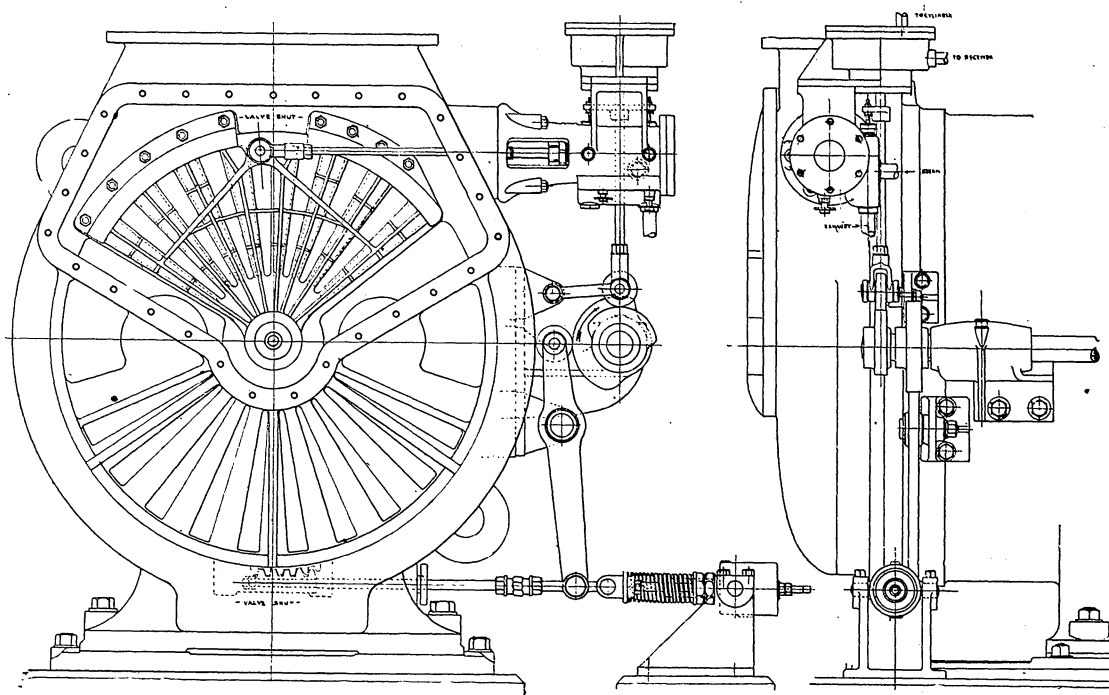


Fig. 1.—Automatic Air Valve, Bessemer Blowing Engine, Cambria Iron Company.

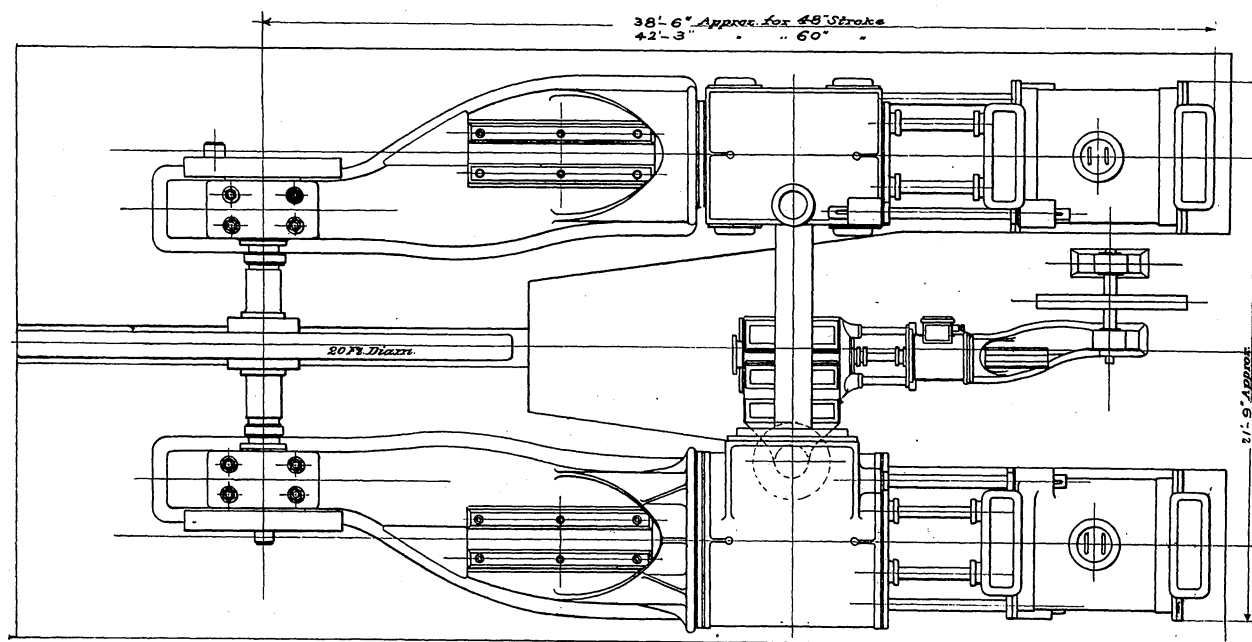


Fig. 2.—Plan of Cross Compound Bessemer Blowing Engine.

AUTOMATIC VALVE GEAR FOR BLOWING ENGINES.

and blast-furnace purposes, due to the continued crystallization and breakage of the ordinary metal valves used, and the liability to accident from such breakages, also the consequent limited speed

* A paper presented at the World's Engineering Congress before the American Institute of Mining Engineers.

tion by the air pressure and in the other by a spring. To make them tight and protect them from undue jar various forms of leather and gum cushions have been used. All, so far as I have been able to learn, require frequent renewal and expensive repairs.

To overcome the liability of breakage

siderable friction and heats the air to a higher temperature than if it had a free passage. In addition to this it is impracticable to allow these valves a lift of one-quarter of their diameter in order to get the full area without shortening their life very much. Furthermore, these valves are very erratic in their

movements, and therefore the area counted upon is never realized in their operation.

overcoming the difficulties explained above. They feel that they have succeeded in getting a free passage for the

fore been possible. Thus far they have used gridiron valves, so well known in connection with steam engines. They

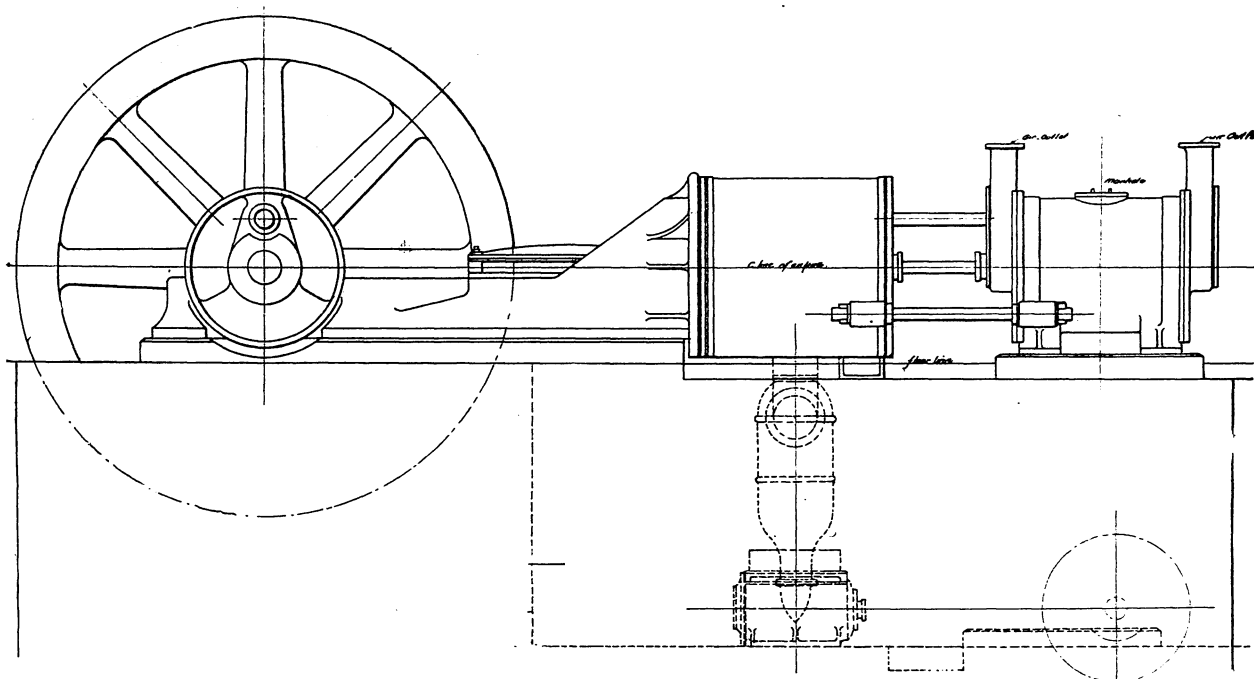


Fig. 3.—Side Elevation Cross Compound Bessemer Blowing Engine.

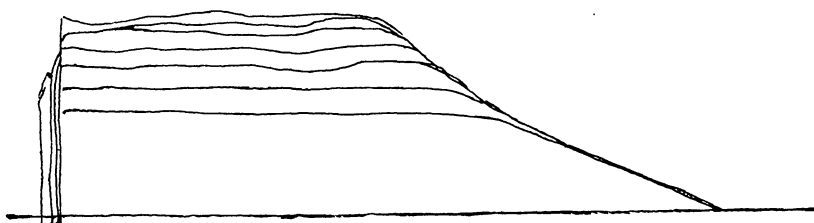


Fig. 4.—Indicator Diagram.—Starting Up, Partial Pressure in the Receiver.

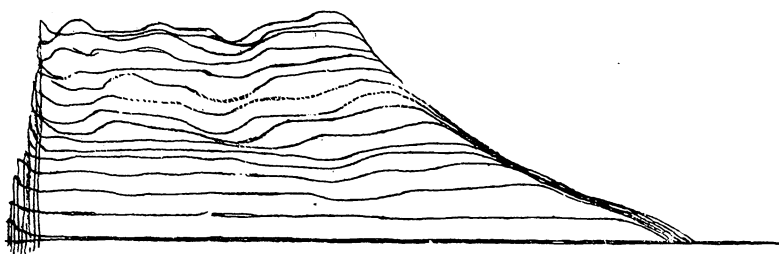


Fig. 5.—Indicator Diagram, Front.—Starting up from no Pressure.

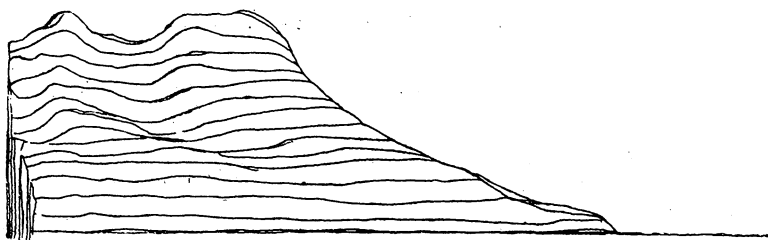


Fig. 6.—Indicator Diagram, Back.—Starting from no Pressure.

AUTOMATIC VALVE GEAR FOR BLOWING ENGINES.

The Southwark Foundry & Machine Company of Philadelphia expended a large amount of money in experiments upon air-valve gear, with a view to

air to and from the tub, and at the same time in making the gear entirely automatic and capable of running at much higher speeds than has hereto-

have made them with as many ports as practicable, in order not to reduce the area of the valve opening to such an extent as to have the air affected appreciably by the heated parts of the cylinder head.

In an 84 inch blowing tub they have been able to secure at each end seven large ports for inlet, and a like number for the outlet valves, these ports being of very liberal area, giving an average of 10 per cent. of air piston. They have, however, designs for other styles of valves, which they are experimenting with, with a view to further improvements, if practicable. By having a number of ports it will be understood that the moment the valve begins to open the area is multiplied very fast. Notwithstanding the valve is almost instantly opened the full amount, this feature is an advantage.

Fig. 1 shows the head on the blowing tub of a double horizontal blowing engine, made for the Bessemer plant of the Cambria Iron Company by the above firm in 1883. This valve is of the fan shaped gridiron type. Under ordinary circumstances this would be subject to criticism, owing to the fact that there would be more wear near its periphery than at its axis, and thus lead to leakage; but the design is such that in its operation it lifts from the seat just at the moment it moves, and rests on the back surface until the movement is completed, when it is forced back to its seat by the incoming or outgoing air, as the case may be. The efficiency of this device is shown by the fact that after five years of constant service the wear upon the face of these valves is hardly perceptible. This valve is actuated by steam applied to the piston of a supplemental cylinder, as shown in the engraving. The steam is admitted and shut off from this cylinder by a pilot valve, which in turn is moved by the accumulating pressure in the tub acting on a differential piston and a cam, alternately.

This vertical differential cylinder is connected on the larger end to the

blowing cylinder, and on the smaller end to the receiver. The ratio of this differential piston is proportioned in such a way as to cause it to start the movement of the pilot valves a little in advance of the time at which the piston in the blowing tub arrives at the point where the outlet valve should open. This is done to prevent the building up of a pressure, in advance of the opening of the outlet valve, greater than that in the receiver. This device has accomplished the purpose for which it was designed to the entire satisfaction of the makers and users of this engine. The inlet valve is positive in its movement, and is actuated by a cam, as shown upon the cut.

This engine, I understand, has been no more trouble to the users than the ordinary steam engines without the air attachment used about their mill. In other words, it is not necessary for the engine to be overhauled on Sunday in order to have it ready for the next week's work, as is the case with the old-style blowing engines. The engine in which the above valves are used is a quarter crank, with steam cylinders 48 inches diameter, air cylinders 60 inches diameter, both 72-inch stroke.

Fig. 2 shows a plan of an engine similar to that furnished the Cambria Iron Company, with the exception that it is a cross compound. The steam cylinders are of the well-known Porter-Allen type. This engine can be disconnected and one side run alone. I very much prefer horizontal engines, as all the parts are more stable and accessible and less liable to neglect, owing to the fact that it is so easy to look after oil cups and other parts. It has been argued by many that the horizontal engine is difficult of maintenance, owing to the wear of the cylinders. In the above case there has been no trouble whatever from this source. The cylinders are in excellent condition, although no tail rods or other devices frequently thought necessary have been used. The above-stated company have in operation horizontal tandem compound engines, with low-pressure cylinder 75 inches diameter, 66 inches stroke, running at 80 revolutions as common practice, and at times higher, and after a year's use there are no signs of difficulty with the cylinders.

The air end of the blowing engine mentioned above is entirely automatic, and as an interesting exhibit I insert Figs. 4, 5 and 6. The former is a card taken when starting the engine, with partial pressure in the receiver. It shows that the pressure was built up automatically from the point at which the engine started to the maximum. The latter shows a card taken with no pressure in the receiver at the start. It illustrates the automatic building up of the pressure from the atmosphere to maximum. In explanation of the apparent distortion of the above diagrams I would say that the cards were not superposed, owing to the fact that the string stretched as the speed increased, and in opposite directions—the indicators being one right and one left. Each of the various diagrams, when considered separately, shows the absolutely automatic action of the valve.

Fig. 7 shows an arrangement of our valve gear on a tub 84 inches diameter by 60 inches stroke, to work vertically, built for blast-furnace work. This gear shows the outlet valve as being opened with the pressure from the tub and closed by a cam. The Southwark Foundry & Machine Company have gears which are not shown here, where the outlet valve is operated with air from the tub in one

direction and from the receiver in the other. The inlet valve in each case is positive. Fig. 8 shows cards taken from a Bessemer engine, operated by air both ways, now running upon the Bessemer plant at the Homestead Steel Works of the Carnegie Steel Co., Limited. These cards were taken by Daniel Ashworth and P. J. Fickinger, mechanical engineers and experts, of Pittsburgh,

The improvements shown in the engravings are so novel as to have made it possible for the inventors to obtain patents with practically no references by the Patent Office.

As to blowing engines, the writer hopes to see the day when the vertical engine, driven from the fly wheels, will also be a thing of the past, as the cross head of necessity becomes a long beam.

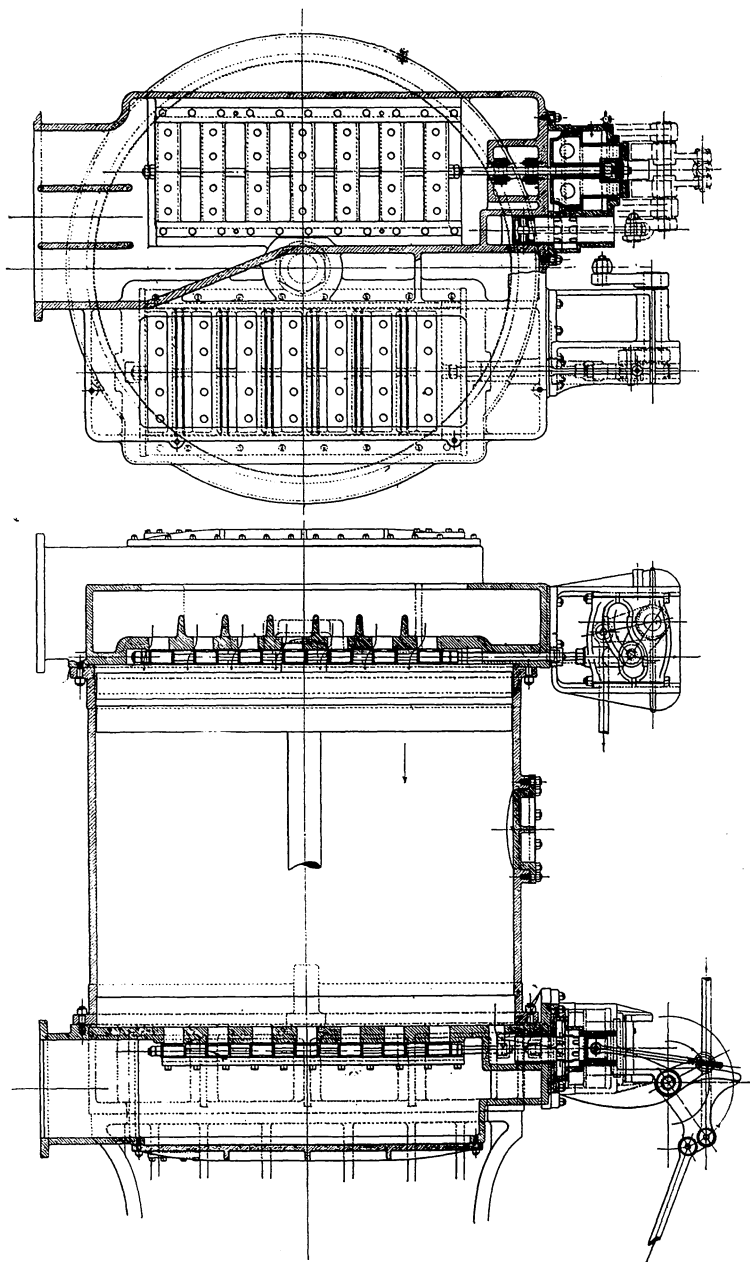


Fig. 7.—Air Gear for High-Speed Vertical Blast-Furnace Blowing Engine.

AUTOMATIC VALVE GEAR FOR BLOWING ENGINES.

retained by the Carnegie Steel Co. to look after the economical working of their engines and boiler plants.

I have no hesitancy in saying that enough has been done in the direction of high-speed automatic air ends for blowing engines to assure engineers that they are a success and that at no distant day the old-fashioned mushroom valve will be a thing of the past. There have been the usual difficulties and anxieties in reaching the present state of the art, but we now have no doubt as to the practicability of running the air end of blowing engines as fast as it is advisable to run the steam end.

This engine is commonly used because of the small amount of room occupied in its installation, and the seeming lower price. I say "seeming," because in my opinion an engine of this class in five years' time costs any one using it much more than a quarter crank, either horizontal or vertical, after the interest on extra cost for building and ground is added, owing to the increased cost for maintenance and repairs. The breakage of a crosshead in the first-mentioned engine sometimes leads to a very large expense, as there is a possibility of the destruction of the most expensive parts of the engine.

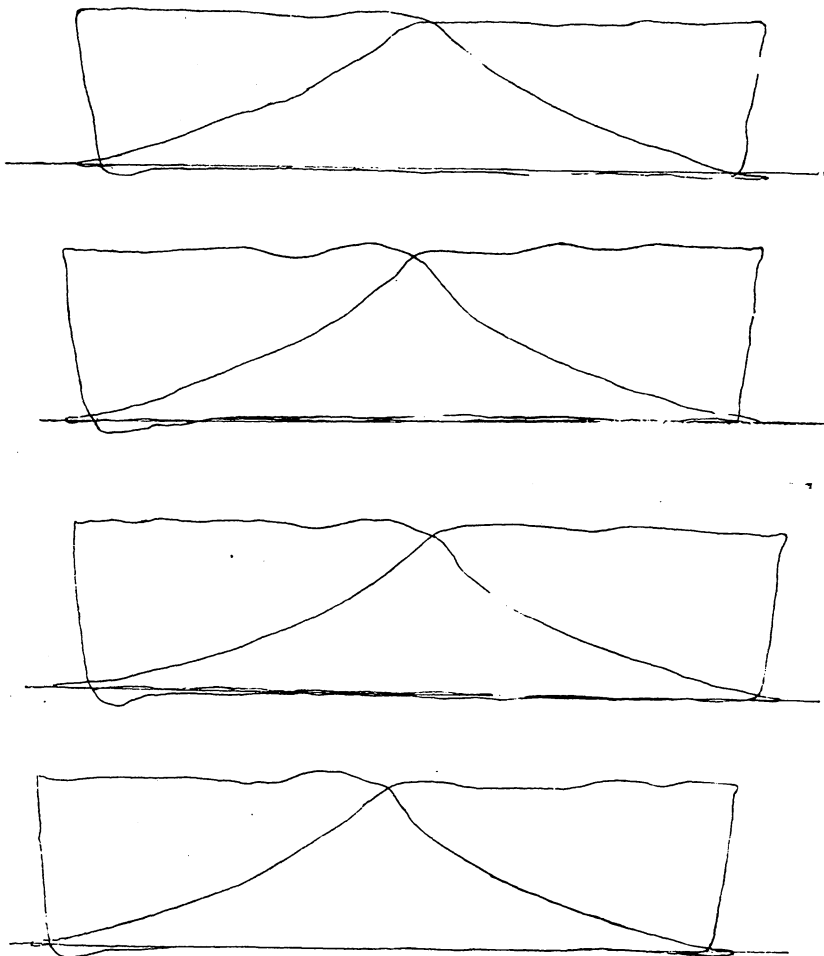
Stay Bolts and Their Inspection

We find much valuable information in a report recently presented to the Southern and Southwestern Railway Club by a committee consisting of R. P. C. Anderson, F. H. McGee and W. H. Owens. Although the committee first endeavored to obtain data on stay-bolt inspection from important and well-known railroads, they found the replies were so varied and the opinions so different that they determined to investigate the subject for themselves. They therefore tested a number of locomotives coming in with leaky tubes,

selected by sounding with a light pressure of 50 or 60 pounds and no water in the boiler to deaden the sound than in any other way.

The committee came to the following conclusions regarding the portions of the fire box in the various patterns of boilers in which most broken stay bolts are found and should be looked for, the results being obtained from roads representing 12,446 locomotives as well as from their own experience:

In a long fire box, either of the radial stay or Belpaire pattern, where there is no sharp bend or O G in the sides, the most broken stays are usually found in the first two or three side rows at the front and back ends



(Rev. per minute, 50. Boiler pressure, 90 pounds. Blast Pressure, 22 pounds.)

Fig. 8.—Indicator Cards, Homestead Bessemer Blowing Engine.

AUTOMATIC VALVE GEAR FOR BLOWING ENGINES.

both with and without pressure and with and without water in the boilers. They found by experience that "every row of stay bolts has its own particular sound and this sound varies with the location of the stay bolts in the rows." On several occasions, in order to test this, one of the committee sounded the stays, took record of those he thought broken and then sent the boiler makers in separately to make their own examinations. The result was that the three examiners had selected several stays that were broken and each had marked stays he thought cracked or broken, but which had not been marked by the other two. Upon cutting out all the suspected stays it was found that some were broken, some cracked and others perfectly sound.

It was found to be unquestionably true that more broken stays could be

of the fire box. Generally the majority of them are in the front, and on the right-hand side, where the right-hand injector is most used. Where there is a sharp O G in the sides of the fire box, whether long or short, the most broken stays are found in these sharp bends, equally distributed along the entire length of the fire box. With crown bar fire boxes, especially where short and deep, there seems to be no well-defined place where the stay bolts most frequently break, but one feature is to be observed in the breaking of stay bolts with these boxes which is not usually found in the long radial stay or Belpaire boilers—that is, a large number of broken stays are found around the back heads, especially around the fire door.

It is explained that since the boiler pressure is a very inconsiderable item in the strain on a bolt, they must be broken by the constant bending backward and forward, this being caused by the movement of the inside fire box. The maximum movement is longitudi-

nal in the case of long fire boxes supported by Belpaire or radial stays, and is vertical with the crown bar, short, deep fire boxes. The greatest movement is at the O G, with radial stay boilers and crown bar boilers having a sharp O G at the sides, as that is the weakest part of the boiler. It is natural, therefore, to look for broken stays at these points.

Treasury Decisions

Steel and Iron Wire Rope with Jute Cores

Before the United States General Appraisers at New York, July 19, 1893. In the matter of the protests, 17,288b, &c., of Upson, Walton & Co., against the decision of the Collector of Customs at Cleveland, Ohio, as to the rate and amount of duties chargeable on certain steel and iron wire rope, imported per rail, September 13, 14 and 23, 1891, and August 22 and 25, 1892. Opinion by Wilkinson, General Appraiser.

The merchandise consists of steel wire rope and iron wire rope.

Appellants claim exemption from duty for the jute cores, which were assessed at 2 cents or 1 cent a pound additional, according to the make of the rope. Paragraph 148, N. T., provides for additional duty at 2 cents a pound on steel wire rope and 1 cent a pound on iron wire rope.

We hold that this duty must be taken on the gross weight of the rope, including the jute core, and the protests are overruled accordingly.

Bicycle Axles, Screws and Nuts.

Before the U. S. General Appraisers at New York, July 21, 1893. In the matter of the protests, 16,276b-9434 and 16,277b-9436, of Chas. D. Stone & Co., against the decision of the Collector of Customs at Chicago, Ill., as to the rate and amount of duties chargeable on certain axles, screws and nuts, imported per "Cific," February 23, 1892, and "Majestic," March 5, 1892. Opinion by Sharretts, General Appraiser.

The local appraiser reports and we find as a fact that the goods covered by these protests are axles, screws and nuts of steel designed for use in the manufacture of bicycles. The appellants claim that said goods are dutiable under the respective provisions of paragraphs 154, 158 and 176 of the act of October 1, 1890. The Collector assessed duty on the merchandise at 45 per cent. ad valorem under paragraph 215, N. T.

In our opinion the claim of the appellants is well founded, and we sustain the protests as to the axles and steel nuts, which are denominatively provided for within the limitations in paragraphs 154 and 176 respectively. The screws, samples of which were submitted to the board, are not bolts, nor are they commercially known as bolts. We overrule the protests and affirm the Collector's decision with regard to these articles.

One of the greatest wagon and carriage works in the West started up recently after a season of idleness. They usually employ 1800 men, but could only find work for 600 hands, and the others were informed that no promise of employment in the near future could be given them. A cut of 25 per cent. was made in the salaries of officers of the company, superintendents and foremen, 10 per cent. in the wages of skilled mechanics and specialists; 5 per cent. on common labor. The company have a large export business, but do not find it affording any support in the present curtailment of the domestic trade.

The History and Modern Development of the Art of Interchangeable Construction in Mechanism. - II.*

BY W. F. DUFFEE, WEST NEW BRIGHTON,
STATEN ISLAND, N. Y.

Grinding machines for the production of flat and cylindrical surfaces by the action of emery or corundum wheels had their origin in America and have largely augmented the possibility of cheaply producing accurate work in metal. The grinding lathe as perfected by J. Morton Pool in 1868 is believed to have been the first apparatus by which long cylindrical rolls could be given automatically and at once an accurate surface and uniform diameter. So delicate is the action of the very simple mechanism employed that a uniform reduction of diameter of $\frac{1}{1000}$ inch is quite within its powers. The invention and successful operation of this admirable tool have made possible the manufacture of widths of paper unknown and unattainable before.

The success and possibility even of the various grinding lathes and similar machine tools that have been developed in the past 20 years is due to a very simple American invention—the solid emery or corundum wheel, which had ground its way into recognition and universal employment in all the machine shops of the world.

The modification of the lathe known as the boring machine probably originated in Germany; for in a work published in Nuremberg, in 1662†, there is an engraving of a duplex boring mill operating upon two musket barrels at the same time, and in a treatise on Artillery, published in France in 1647‡, there is a vignette in which a cannon is shown as being bored by a vertical bar.

About the middle of the last century cannon and pump cylinders, also cylinders for Newcomen engines, were bored horizontally in rude boring mills at Carrun Iron Works in Scotland, and in 1769 that celebrated engineer, John Smeaton, designed new boring machinery for these works. It does not appear that this machinery was perfectly satisfactory, as in a proposal from Boulton & Watt to the Carrun Iron Company in 1776 for the construction of an engine to return the water to their water wheels, Mr. Boulton says: "Mr. Wilkinson has bored us several cylinders almost without error; that of 50 inches diameter, which we have put up at Tip-ton, does not err the thickness of an old shilling in any part, so you must either improve your method of boring or we must furnish the cylinder to you." "The thickness of an old shilling" seems to have been regarded as a very satisfactory standard of permissible error in such work one hundred years ago. The Mr. Wilkinson spoken of by Mr. Boulton was John Wilkinson of Bersham, near Chester, who had invented improvements in boring machinery in 1775. He it was who first moved a cutter head along a boring bar, supported at each end, and as simple as this idea now seems, it was not perceived by such acute men as Smeaton and Boulton and Watt.

* Abstract from a paper read at the World's Engineering Congress before the American Society of Mechanical Engineers.

† "Treatum Machinarum novum et cet."

Per Georgius Andrean Bocklerum, 1662.

‡ "Memoires d'Artillerie," par le Sr Surirey de Saint Remy.

The first planing machine of which we have any account is said by Reenle (Buchanan on mill work) to have been invented by Nicholas Jorg, a French clock maker, in 1751, and to have been actually used in planing the interior of the wrought-iron pump barrels used in the machine erected by order of Louis XIV for the supply of the water works at Versailles.

I shall not attempt to discuss the question of who was entitled to the credit of first introducing the metal-planing machine into England. Claims have been made for Bramah, Fox, Clement, Murray, Roberts and possibly some others. There is little doubt that all the persons named constructed, independent of each other, during the 30 years preceding the year 1820, some form of mechanism for planing metal.

The style of planer known as the "shaping machine" was invented by the late James Nasmyth, the inventor of the steam hammer, in 1836. It was at first called "Nasmyth's steam arm." It has been greatly improved by Whitworth and other leading tool builders.

The first machine for planing the teeth of wheels in which the action of the tool was regulated by a guide curve was invented in 1839 by the brothers Glovet.

The vertical planer or "slotting machine" was doubtless suggested by the mortising machine for wood. Machines of this kind were built by G. Nasmyth in 1836. America has done its full share in the development and improvement of construction of machine tools of all kinds, and the work of Wm. Sellers & Co., Bement & Miles, Brown & Sharpe, Pratt & Whitney, the Putnam-Machine Company, Niles Tool Works and scores of other makers of American machinery is known and honored wherever hammers beat and wheels turn.

The art of making a cartridge shell of sheet metal originated in France. In the year 1824 M. Cazalet patented a cartridge of this material, and in 1834 M. Roberts of Paris invented a metallic cartridge, in which the fulminate was deposited in an annulus around the base, which was made of a separate piece of metal from the body of the cartridge. The idea of using a metallic cartridge did not attract much attention until M. Flobert about 1850 commenced the manufacture of a pistol intended for use for practice at short range. This pistol could only use a small metallic cartridge, charged exclusively with fulminate. Flobert's pistol and ammunition met with considerable favor for its purpose, and doubtless it had a stimulating influence upon the development of the manufacture of metallic cartridges of an improved type.

To Smith & Wesson of Springfield, Mass., without doubt belongs the credit of making the first metallic cartridge suited to the requirements of actual service in war. In 1854 they patented a form of cartridge that has always been used in the well-known pistol made by this firm.

It is believed that the general system adopted in the manufacture of the modern metallic cartridge is purely American. The rapidity, accuracy and economy with which they are manufactured is the result of the perfecting of a large number of special automatic machines, whose work is so exact that any cartridge will fit accurately—that is, will never be too large for, and never more than $\frac{1}{1000}$ inch smaller than the chamber of the arm in which it is intended to be fired.

The Union Metallic Cartridge Company of Bridgeport, Conn., which for 30 years was under the skillful management

of the late A. C. Hobbs, have been the leaders in the development of this industry, and have supplied the principal foreign governments with large quantities of ammunition and cartridge-making machinery, and it is only just to say that the system of manufacturing metallic cartridges, now regarded as the best throughout the world, was brought to its present state of perfection in these works during their administration by Mr. Hobbs.

The art of interchangeable construction was strongly reinforced by the discovery of the method of forging in dies. This idea was but an application of the art of coining cold metal for use in money (which had been known since the time of Darius, 500 B. C.) to the shaping of metal while hot. The art of forging in dies is believed to have originated in France about the middle of the twelfth century, and numerous examples of hinges, grilles and wrought-iron ornaments of various kinds remain as elegant testimonials of the cultivated taste and wonderful skill of these ancient artists in iron. Forged ornaments shaped by dies were common on all the pleasure carriages made in the last century, and it is certain that the wonderful "one-horse shay" would not have been the masterpiece it was if its "step irons" had not been decorated with "swaged" ornaments.

It seems but a very short step indeed from the forging of ornamental iron work in dies to the forging of the smaller parts of machinery in the same way; but as short as it undoubtedly was, it does not appear that it was taken until the late Albert Eames introduced the practice of forging parts of muskets and pistols in "dies or swages" at Chicopee, Mass., in 1842.

One more step forward in the art of forging the parts of interchangeable mechanisms brings us to what is known as drop forging. This art is believed to be of American origin and was first used at Harper's Ferry, Md., in the year 1827, in the works of J. H. Hall. An improved form of drop forging machine was made by the late Albert Eames for the Remington Works, at Ilion, N. Y., in 1846. From this date the use of the process of drop forging has rapidly increased, and it has been applied to the manufacture of very intricate as well as delicate articles. The Billings & Spencer Company of Hartford, Conn., have for the past 25 years turned out annually large numbers of shuttles for sewing machines so nearly exact in size as to require little work and polishing to render them fit for their intended service. The art of drop forging is also used for producing the heavier parts of bicycles and for an endless variety of forgings in iron, steel and copper, forging of the latter metal having come into use for electrical machinery within the last eight years. So important has the art of drop forging become as a factor in manufacturing that at the present time no establishment for the manufacture of interchangeable mechanism of which forgings are a component part can afford to ignore its advantages. In the making of drop forging the preparation of the dies is a matter of the first importance, and so high has American skill in this particular been appreciated abroad that from time to time large numbers of finished dies have been sent from America to foreign countries. The Billings & Spencer Company of Hartford, who are pioneers in the art of drop forging, shipped at one time 42 tons of dies to Russia for the making of forgings for the parts of muskets.

The discovery by the late Sir Joseph Whitworth of a way to produce plane surfaces on metal by "scraping" has had a marked influence in increasing the accuracy of work intended to be interchangeable, and so accurate have surfaces been made by the method described, that in a paper read by him before the Institute of Mechanical Engineers at Glasgow in 1856, it was demonstrated that when two such surfaces are placed in contact it requires more force to separate them than the equivalent of the pressure of the atmosphere upon them, thus showing that the surfaces were approaching the condition of actual molecular cohesion.

Thus far I have discoursed of the development of methods and apparatus which have rendered possible the art of interchangeable construction as it is understood to-day; and have had little to say of special industries whose products are representatives of the degree of perfection to which the art has attained.

When the idea of interchangeability was first promulgated it was advocated with special reference to the manufacture of muskets, and it is a common belief that the idea of making the parts of muskets interchangeable originated in America, but the facts of history compel us to say that this view is not correct. Thomas Jefferson, writing from Paris to John Jay, under date of May 30, 1785, says: "An improvement is made here in the construction of muskets, which it may be interesting to Congress to know should they at any time propose to procure any. It consists in the making of every part of them so exactly alike that what belongs to any one may be used for every other musket in the magazine. The Government here has examined and approved the method, and is establishing a large manufactory for the purpose of putting it into execution. As yet the inventor has only completed the lock of the musket on this plan; he will proceed immediately to have the barrel, stock and other parts executed in the same way. Supposing it might be useful in the United States, I went to the workman. He presented me the parts of 50 locks, taken to pieces and arranged in compartments. I put several together myself, taking pieces at hazard as they came to hand and they fitted in the most perfect manner. The advantages of this when arms are out of repair are evident. He effects it by tools of his own contrivance, which, at the same time, abridge the work, so that he thinks he shall be able to furnish the musket two livres cheaper than the common price. But it will be two or three years before he will be able to furnish any quantity. I mention it now, as it may have an influence in the plan for furnishing our magazines with this arm."*

On January 24, 1786, Mr. Jefferson writes a similar letter to the Governor of Virginia, in which he is even more emphatic in regard to the gun locks he has examined, saying that "I found them to fit interchangeably in the most perfect manner."

In the year 1804 (19 years after Jefferson had found that gun locks were manufactured in France which "interchanged in the most perfect manner") Eli Whitney, the inventor of the saw cotton gin, contracted with the United States to furnish them with 10,000 stand of arms. In regard to this work his biographer says:† "The object at

which he aimed, and which he fully accomplished, was to make the same part of different muskets, as the locks, for example, as much like each other as the successive impressions of a copper plate engraving." This was a very high standard, and Mr. Whitney struggled energetically against all sorts of difficulties, and doubtless realized to some considerable degree his intention of making the parts of the muskets interchangeable, and is entitled to great credit for the pioneer work in the art of interchangeable construction which he accomplished, and the large measure of success which he achieved in carrying out with the limited resources available in America at the time the idea which Thomas Jefferson stated 13 years before the date of Mr. Whitney's contract was being prosecuted successfully in France.

Looking backward at the art of interchangeable construction as exemplified in the work done at the beginning of the century and viewing it in the light of the exact requirements of to-day, it is certain that very little of the work done at that time would pass inspection now. Most of the parts of the old muskets would doubtless interchange, but the exactness of the relations of the parts would not be found up to present standards. The demand for such precision was not made, and could not with the means at command have been realized if it had been insisted upon. Even the mechanical means of attaining interchangeability in some of the parts of muskets were not invented until 1853.

As a consequence of the pioneer work of Eli Whitney, and the enthusiastic zeal with which the path he blazed through unknown regions has been followed, widened and extended by multitudes of ingenious and skillful mechanicians, America has become the great school of the world for all who are seeking instruction in the art of interchangeable construction. As a result of the excellent work on a small exhibit of rifles by Robins & Lawrence of Windsor, Vt., at the International Exposition of 1851 in London, the British Government sent a commission to America to study the methods of manufacture by which interchangeable construction was attained.

This commission visited Springfield Arsenal and a number of other public and private armories, and, as a result, they at once ordered a large quantity of American gun-making machinery and secured the services of a number of mechanicians to accompany it to England and there establish the Enfield rifle factory, the first in Europe in which arms were made on the American interchangeable system.

As an illustration of the perfection which this system has attained, when the English commission visited Springfield Armory in 1853 Major Ripley, who was then in command there, ordered ten guns, manufactured from 1843 to 1853, to be taken apart, the parts indiscriminately mixed, and the ten guns were then successfully assembled by selecting the parts at random from the general mass.

Since the year 1853 American gun-making machinery has been supplied to the governments of England, Spain, Prussia, Sweden, Russia, Denmark and Egypt, and large quantities of American arms and ammunition have been shipped to all quarters of the world. So manifest were the manifold advantages of the system of interchangeable construction as applied to the manufacture of arms, that it has been extended to a

great variety of other industries, in which large numbers of the same kind of product are produced—locks, sewing machines, steam valves, steam engines, hardware and agricultural implements, clocks and watches. The idea of manufacturing watches by the interchangeable plan is distinctly American, and was first carried into effect on a large scale at Waltham, Mass., in 1854. Since that date watch factories have increased and multiplied in the land and foreign nations have been compelled by American competition to adopt the idea which is the crowning triumph of the American system of interchangeable construction.

In the foregoing outline of the development of those arts which are distinctly tributary to the art of interchangeable construction, I have endeavored to show that the idea of interchangeability in the construction of mechanism is of no recent origin; that in fact, if not in name, the commencement of its practical development was coeval with the satisfaction of the most primitive of the artificial demands of man upon the materials of the world in which he found himself placed; that as mankind increased and multiplied his requirements of nature the elements from which to create the art of interchangeable construction were necessarily augmented by the discovery of new methods and the invention of apparatus for their utilization; that this process of mental demand and material supply changed gradually from the simple and easy to the complex and difficult; but, nevertheless, every demand within what we have been irreverently taught to call the laws of nature has been successfully met by the crystallization in its work of enough of the immortal soul of each succeeding generation to enable the world of our day to enjoy the usufruct of the labors of all time past, and to rejoice in the practical perfection to which the art of interchangeable construction has attained.

There is a point in the following humorous story, which sets forth an actual occurrence: A mill owner who had purchased a larger engine contracted with a bricklayer to put in the necessary foundations. The bricklayer sublet the contract to another party. When the engine arrived it was found that the brick work for the bedplate was too wide to make a good job. The bricklayer was sent for, and he decided that the shortest way to remedy the mistake was to chip off the bricks, believing, of course, that the foundation was of solid brick work. When this was attempted the whole side fell in and the fact was disclosed that the foundation was but a shell, filled in with broken brick and stone. The bricklayer was greatly surprised, and tried to excuse himself for having sublet the job to such an unreliable workman, saying that he did not understand it, because the man certainly knew better, as he had 30 years' experience. Then the mill owner broke in. He was a Hebrew. "That's just what's the matter," said he. "He's been in the business so long he gets acquainted with all the tricks. Get me a man who don't know so much."

The most powerful hydraulic crane at present existing is reported to be that at the Government arsenal at Spezia, Italy. It is capable of lifting 160 tons, or 10 tons more than the large electric crane at the Creusot Iron Works.

* "The Writings of Thomas Jefferson." Edited by H. A. Washington. 1853.

† "Memoir of Eli Whitney, Esq.," by Denison Olmstead, 1866.

The Garvin Milling Machines.

We here illustrate three types of milling machines built by the Garvin Machine Company of Lighthouse and Canal streets, New York. The first machine is specially adapted for use in jobbing shops where a large variety of plain milling is done. It is designed for plain, heavy work. The frame is cast in one piece, all bearings are made to stand the heaviest usage, and the spindle drive and feed motions are direct and powerful. The spindle is of steel, has a $\frac{3}{8}$ inch hole extending through it, and tapered front bearing running in a solid bronze box, with two hardened and ground anti-friction washers to take the thrust and special self-oiling facilities. Wear is taken up by facing off a cap which screws on over a collar on the spindle, by this means forcing the spindle back into the bearings, where it is securely held. It is driven by a cone of large dimensions, back geared $5\frac{1}{2}$ to 1.

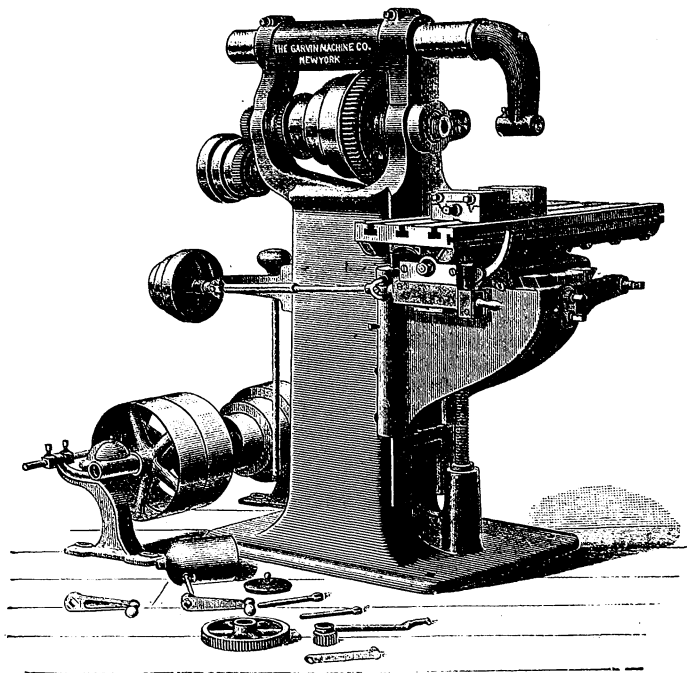
The arm is of the overhanging telescope pattern, and in its outer end is fixed a hardened and ground split center, which forms a rigid outer support for the arbor, and allows for expansion due to heat from the cutter. The table has three T-slots, and is powerfully fed its entire length by a large bronze screw running in oil and engaging with a coarse pitch spiral rack or section of nut, cut on the underside of the platen its full length. It is also provided with a quick return, by means of a shaft at the right of the knee, and when desired is fitted with oil pockets at the ends. The vertical and transverse adjustments of the table are to $\frac{1}{1000}$ inch. The feed is driven by means of cones, the upper one being provided with change gears, which are protected and can be instantly changed. Twelve feed changes are thus provided, and for the coarsest feeds the belt velocity is highest and its driving power greatest. A reverse feed is obtained by providing an extra step on the lower cone and arranging it to shift on its shaft, to admit of crossing the feed belt. A newly designed vise is furnished, which is 6 inches wide and opens to $5\frac{1}{2}$ inches.

The general dimensions of the machine are: Dimensions of table, 12 x 36 inches; vertical adjustment under spindle, 19 $\frac{1}{2}$ inches; adjustment in line with spindle, 6 inches; length of automatic feed, 36 inches; dimensions of front spindle bearing, 3 x 4 $\frac{1}{2}$ inches; largest diameter of cone, 11 $\frac{1}{2}$ inches; number of changes on cone, three; swing under the arm, 14 inches; weight, 2079 pounds.

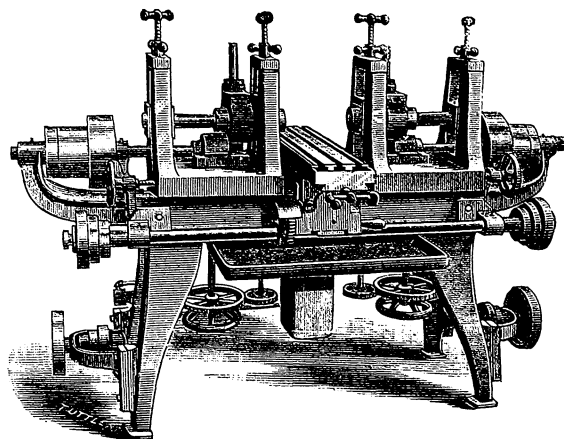
The No. 2 duplex milling machine is designed for doing all that class of milling usually done with gang mills and for facing off both sides of work at the same time without the necessity of resetting it. The bed is of solid, substantial form, to which the heads are securely gibbed and along which they are adjusted by screws with graduated hand wheels, each head having a movement of 3 $\frac{1}{2}$ inches. The spindles are steel with a hole extending through them, tapered at the front end for the reception of tools. They run in babbitted boxes and are provided with anti-friction washers to take the thrust. Each carries a bronze spiral gear into which runs a steel spiral pinion on an upright shaft, carried in a yoke on the head and driven through miter gears from the main cones. The vertical adjustments are by hand-screws. The table is large, has three T-slots the full length and an oil groove all around. The feed is by screw driven by worm

and gear, which receive their motion from a shaft extending across the front of the machine, with clutch cones at each end so that the feed may be driven

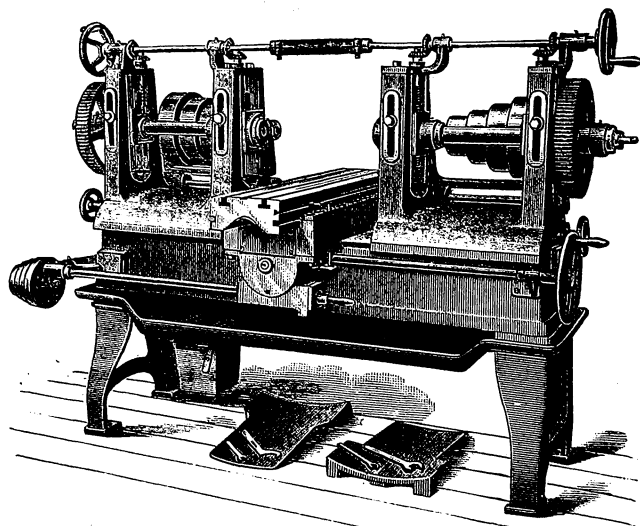
ordered. The principal dimensions of this machine are: Largest diameter of cones, 9 $\frac{1}{2}$ inches; front spindle bearings, 2 $\frac{1}{8}$ inches; vertical adjustment



No. 3 $\frac{1}{2}$ Milling Machine.



No. 2 Duplex Milling Machine.



No. 3 Duplex Milling Machine.

THE GARVIN MILLING MACHINES.

from either end at will. There is an oil pan and tank beneath the bed, to which can be fitted a rotary pump for supplying oil to the cutters when so

over table, 2 to 7 inches; dimensions of table, 7 $\frac{1}{2}$ x 34 inches; length of automatic feed, 17 $\frac{1}{2}$ inches; bearing in cross slide, 18 inches; weight, 1750 pounds.

In the No. 3 machine the bed is 66 inches long, 15 inches wide and 10 inches deep, and is mounted on a stand, with oil pan, tank and automatic pump. The table is large, has a bearing of 31½ inches in the cross slide, two T-slots and is fed by a powerful bronze screw running in oil and engaging a coarse pitch spiral rack, cut into the under side of the platen its entire length. The spindles are steel, with tapered front bearings running in solid bronze boxes, and are provided with hardened and ground anti-friction washers to take the thrust. Ample self oiling facilities and means of adjustment for wear are also provided. They are adjusted vertically by screws and miter gears, which are operated by a shaft passing across the top of the machine, so arranged as to admit of adjusting both spindles at once or independently from either end. The front ends have tapered holes to receive tools, which are held in or removed by stud bolts passing through the spindles and operated from the rear ends. The feed cone provides for four changes, is driven from one of the main cones and is so arranged as to keep the feed belt at the proper tension and insure a steady motion to the table. The heads are adjusted along the bed by screws, with hand wheels, conveniently placed. The largest diameter of cones is 12 inches; the proportion of back gearing is 5 to 1; the front spindle bearings are 3½ x 5 inches; the vertical adjustment over the table is 2½ to 10 inches; dimensions of table, 9½ x 40 inches; length of automatic feed, 40 inches; weight complete, 3350 pounds.

Iron and Steel at the World's Columbian Exposition—V.

BY E. C. POTTER, CHICAGO.

Coming now to the Mining Building one is at once attracted to the most striking feature in this collection of marvels, the exhibit of the Gebrueder Stumm, owners of the famous Neunkirchen Works and joint owners in the Halberghuette of Rud, Bocking & Co., and the largest and most important iron masters in Germany next to Krupp. This firm operate their own mines in Lorraine, quarry their own limestone and burn their own coke. The Neunkirchen Works comprise 8 blast furnaces, 8 cupolas, 6 converters, 2 Siemens-Martin furnaces, 60 puddle furnaces, 20 heating furnaces, 194 steam engines, aggregating 25,000 horse-power, 168 steam boilers, 22 locomotives, 19 trains of rolls, 23 steam hammers. They give employment to 4300 workmen with 8400 dependents. The production for the fiscal year 1891-92 was as follows:

	Tons.
Burnt lime	12,581
Iron Ore	459,428
Coke	116,888
Pig iron	148,047
Castings	5,931
Partly finished material	163,997
Wholly finished material	153,178

The output for the current year, it is estimated, will reach 200,000 tons of pig iron and 160,000 tons of wholly finished material. The Halberghuette is devoted to the manufacture of cast iron pipes and includes 4 blast furnaces, 10 cupolas, 2 crucible furnaces, 47 steam engines, of a total of 1800 horse-power, 16 steam boilers, 2 turbines, 1 water wheel, 2 gas motors. The pay roll contains 1920 workmen with 5200 dependents. The yearly output is 45,000

tons of cast-iron pipes and drains, with fittings.

Probably never before was so elaborate and artistic an exhibit of iron and steel products undertaken (no comparison is made with the exhibit of Krupp, as from the nature of the latter display no comparison is possible). Painstaking care and skill with a very considerable expenditure of money have produced a display that is as striking as it is unique. The entrance is through a portal constructed wholly of cast-iron pipe, which is a veritable Arc de Triomphe of the designer's and constructor's skill. Elaborate designs are worked out in cross sections and longitudinal half sections of various sizes of pipe, the material used being the firm's regular stock. The remarkable finish and surface and accuracy of caliber of these pipes exceed anything to which we are accustomed in this country. The portal, which is between 30 and 40 feet high, is surmounted with a bronze figure of heroic size. Immediately on entering one faces a very unique fountain, the basin of which is formed of a longitudinal half section of 42-inch pipe. Over the fountain is a portrait bust in bronze of Freiherr von Stumm, the head of the firm. On either side are two heroic groups in bronze, the one on the right representing a workman at work at a train of rolls, the one on the left a miner with his pick and a Bessemer converter. On either side of the portal rise two obelisks, each built up of various sized sections of I beams and structural shapes, the one on the right being of steel, the one on the left of iron. The height of the obelisk is 47 feet. To the rear of the fountain, on the extreme right and left of the space, rise two very unique designs in the shape of huge sheaves or trees. The one on the left is composed of rolled bars of iron and steel, encircled at regular intervals with large coils of wire. The one on the right is composed of cast-iron pipe, with elbows, tees, crosses and nozzles, the whole forming a very graceful and novel design. These two designs rise to a height of 66 feet. Immediately in the rear of the fountain is shown a section of the permanent way of the railway over the St. Gothard Pass in Switzerland, composed of Goliath rails—105 pounds per yard—laid on steel ties. Upon the rear wall of the space is hung a rail 180 feet long, bent cold into a series of huge scallops. Below this rail, rising from the floor like a series of steps, are I beams from 6 inches to 12 inches in size and 80 feet long. Above these is a universal mill plate bent on its edge so as to form an arch 66 feet long and 20 inches wide. Along the south end of the space are cases containing samples of iron ore, prominent among which is the famous Minette, which is the principal ore used by the company; samples of coke, coal and limestone, pig iron, various grades of spiegel and ferromanganese, and a very full line of test pieces of iron bars and etchings of iron blooms and billets, showing the piling. At the north end are other cases containing broken sections of steel ingots and blooms, and a great number of physical test pieces. Chemical analyses of all material, both raw and finished, are given. It should be remarked in passing that all the steel used by this company is made by the basic Bessemer process. Adjoining the portal on the north are a great number of pieces of I beams, rails, steel ties and structural shapes bent and distorted in many ways, showing remarkable tenacity and homogeneity of the metal. All these tests were made cold. Not

the least interesting feature of this exhibit is the display of models, which is very comprehensive. All the models are made to scale, and comprise two of the firm's rolling mills, a cast-iron pipe foundry, a basic converter, a hot-blast stove made in sections, showing the construction, and a number of models of the houses built for the workmen by the firm, including an eating house, a bath house, a hospital, sleeping quarters, &c., all made in sections, showing the arrangement of each floor. The rear wall of the space is interesting from the fact that it is made from slag from the firm's works set in cement by a process employed by the Erhardt Bros. of Neunkirchen. Further examples of it are also shown in vases, table tops and other mosaics which are at once artistic and durable and cheap.

The exhibit of Stumm is a stinging rebuke to those concerns who declined to exhibit because of lack of space. As before mentioned, this firm is next to the largest in Germany and there are few larger in America. The space assigned them is very limited considering the large variety of their products, a space that would have been considered niggardly by most large concerns. Yet in this narrow environment they have achieved a display that is one of the features of the exposition; one which has not only maintained but added to their dignity and prominence in the metallurgical world. There are few visitors to the great fair that have not had the name of Stumm indelibly impressed upon their memories by this superb trophy.

At the south end of the main aisle, realizing the words of the poet, "from floor to ceiling like a huge organ" rises the display of the Mannesmann Tube Company. This, together with their display at the south end of the Transportation Building, is a very comprehensive exhibit of the products of this new and very remarkable process. The exhibit in both places includes all sizes of service pipes for the conveyance of steam, water, oil, gas or air, from ½ inch up to 20 inches in diameter, boiler tubes, gun barrels, wagon poles and whiffletrees, hollow axles and shafts, telegraph poles, bicycle frames, artillery shells, &c., &c. The use of these tubes for telegraph poles and the like is of great economical importance in countries where such timber is very scarce or the climate is such that timber is very shortlived. Their application to wagon construction, especially for military service, is a very apparent improvement. The physical tests and distortions shown give ample evidence of the high character of the material and the fact that the tubes are uniformly strong in all parts because of the absence of a seam, necessary in other modes of manufacture.

Russia, that mighty nation which has of late years become the observed of all observers in the shaping of its domestic and foreign policy and the development of its natural resources, and in the consideration of the rather delicate question as to whether Russia is to remain part of Europe or if Europe is to become part of Russia—this country has assembled in the Mining Building a most creditable and interesting display of its iron and steel resources. When one ascertains that even with the numerous works exhibiting the chief, those of South Russia and especially those in the neighborhood of Ekaterinoslavl, are not represented, one's respect for the Russian iron and steel industry is materially increased. The exhibits are confined wholly to the

works located in the Ural district and Warsaw district. First and foremost are the Government mines and works of Ghoroblagodatsky. The ore mined here is a magnetite, carrying 52 to 58 per cent. metallic iron. In the immediate neighborhood of the mines are five iron works, all owned and operated by the Government. There are nine blast furnaces of rather antique type, some using cold blast and others hot blast, with charcoal as fuel. The sizes of the furnaces, as shown by drawings, are 15 feet bosh, 57 feet high and 14 feet bosh, 42 feet high, hearths from 4 feet to 5 feet in diameter. These works are devoted wholly to iron manufacture, having puddling furnaces and Lancashire fires and turning out ordinary and refined merchant bar.

The Votkinsky works, another Government property, has a Siemens-Martin plant, and turns out rails, all kinds of light structural shapes and ship plates. They also have a dockyard for the construction of ships. The model of a petroleum tank steamer recently constructed by them is shown.

Of the private works in the Ural district those of the Princess Abameleck Lazarewa exhibit iron sheets and small sizes of merchant bar. The Balashoff Bros. also display merchant bar and sheets. The Zigazinsky works are engaged only in the manufacture of charcoal pig, and operate their own mines.

In the Warsaw district of Poland are the Bankowahutte, owning and operating their own mines, two blast furnaces, puddling furnaces, a Siemens-Martin plant, and manufacturing steel rails and splices, structural shapes, bars, light plates and sheets.

The Katherinahutte have their own mines and blast furnaces, puddling furnaces, Siemens-Martin furnaces, merchant mill, plate mill and foundry. Their annual output is as follows:

Pig iron.....	Tons. 22,000
Muck bar.....	22,000
Merchant bar.....	12,000
Plates.....	8,500
Castings.....	1,100

Their exhibit shows a full line of rail and structural sections, an iron boiler head perforated and flanged for three cylindrical furnaces and a cast and dressed plate mill roll.

The very important iron industry of South Russia is not represented, except by some samples of most excellent hematite ore and some very rich manganese ore (pyrolusite), together with some samples of coal and coke.

A number of firms have exhibits of fine art castings of iron which are in every way most remarkable. The figures and groups are executed with a delicacy and finish that was not deemed possible with iron and are quite equal to any bronze that it has been the writer's good fortune to see, even among the Russians themselves. There are some features of the manufacture of iron that the Russians are better acquainted with than we are.

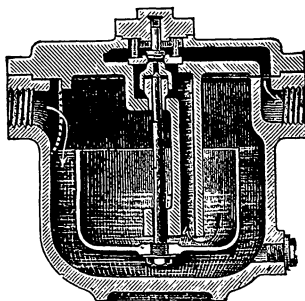
In examining even thus cursorily the evidences of the resources of Russia one cannot help being impressed with the idea that this is a land of promise. One has grown accustomed to look upon the New World, the more recently discovered lands, as those to which we must look for the great future development. But here is a country of vast extent which, though situated in almost the oldest part of the globe, is less known than the far Western States and territories of America or British Columbia. The little that is known makes it certain that with the advent of a liberal

and enlightened government the tremendous development of her agricultural and mineral resources would soon place Russia at the head of the commercial world.

I acknowledge the correction offered by the Avery Stamping Company in the issue of August 17, and gladly accord them full credit for their enterprise in the manufacture of the Laval separator bowls. The information given me at the Swedish exhibit was so far misleading, and involved the Krupp works as well as the Avery Company. I hasten, therefore, to make the *amende honorable* to both concerns, and shall feel that I am entitled to congratulation if in the process of unsnarling the iron and steel tangle at the fair I am guilty of no further error.

The Acme Steam Trap.

This trap, made by Schaffer & Budenberg of 66 John street, New York, and 22 West Lake street, Chicago, discharges automatically the water of condensation without loss of steam, and also the air that may be contained in the pipes, so that no valve need be pro-



The Acme Steam Trap.

vided for that purpose. In this apparatus the open float carries a spindle which closes against a small outlet passage in the main outlet valve when the float is forced upward by the water which has collected in the trap. The main outlet valve is forced upward against its seating by the steam pressure in the hollow part of this valve, and when the water in the trap overflows into the float and causes the latter to sink, the small valve is first opened, thereby allowing the steam in the cavity of the main valve to escape, so as to relieve it of pressure from below. The valve is consequently fully opened, allowing the water to escape freely until the float has again risen sufficiently to close the valve. The air in the trap is free to escape past the spindle and through the small passage in the main valve. This combination of a small valve and a large one gives the trap the advantage arising from large capacity when compared with others of the same size. All the movable parts of the trap can be easily taken out for examination or cleansing through the small opening in the cover of the trap without removing the entire cover, and the interior parts can all be taken to pieces without disconnecting the trap. It is unnecessary to provide the trap with a check valve in the delivery pipe in cases where the water is forced against a head.

In referring to the condition of business in Central Ohio, in our issue of August 24, page 349, a correspondent stated that the Canton Steel Roofing Company were using their new building

and machinery. This was an error. It is the Berger Mfg. Company of Canton, Ohio, who have moved into a new building 600 feet long. It is claimed that with its annexes it gives them the greatest capacity in the country in roofing, siding, ceiling, eave trough, cornice, finials and special work.

The World's Fair Buildings.

How to dispose of the World's Fair buildings in Jackson Park without paying for their removal is just now beginning to trouble the exposition management, and Director of Works Burnham has been ordered to estimate the salvage value of every iron girder and stick of timber in the buildings. It appears almost incredible that the main exhibit buildings alone, which, according to Auditor Ackerman's July monthly report, have cost \$7,019,205, should be without value at the close of the exposition. At one time it was thought by the directors there would be a reasonable amount of salvage, but the estimates gradually dwindled to \$1,000,000. That was low indeed, but some of the directors now say they will be lucky if they do not have to pay for the removal, including the gift of the material of the \$7,000,000 group of structures. The Administration Building, for instance, has cost \$463,212, and now it is estimated that it would be worth the donation of the entire building and a fee of \$10,000 in addition to remove it and leave the ground in the condition stipulated by the South Park Commissioners, from whom Jackson Park was leased. Manufactures Building cost \$1,172,431. Its stupendous iron trusses, 250 feet high, do not seem to be in demand. Agricultural Building represents \$659,234, but nobody wants it. The same is true of other structures, for not a single offer to purchase has yet been tendered. The same conditions existed, however, at the close of the Centennial. There was no immediate demand for the structural material, but the contractors who were able to purchase it and hold it found opportunities to work it off at a good profit. Centennial buildings were reproduced in whole or in part in widely scattered sections of the country.

A Large Eye Bar.

The Phoenix Iron Company of Phoenixville, Pa., have made steel eye bars of exceptional size for a bridge now being built at the works. The bars are 10 x 2½ inches, measuring 50 feet from center to center of pin holes. The elongation after fracture of a bar tested, taken in 47 feet, was 9 feet 9 inches, or 20.47 per cent. The reduction of area was 50.4 per cent. The fracture was silky, half cup and half angular, showing no crystallization whatever. The pin hole showed an enormous elongation, viz., 2½ inch. The elastic limit was 33,250 per square inch. The ultimate tensile strength was 61,720 per square inch, putting an actual breaking strain on the bar of 1,626 322 pounds. The testing machine on which this bar was pulled is the largest in the world, having a capacity of over 1000 tons.

Rich deposits of asphaltum are reported to have been discovered on the Uintah reservation in Utah, and a St. Louis syndicate is said to have been organized to obtain possession of the deposits.

THE WEEK.

The Watkin tower, at Wembley Park, near London, is approaching completion. Sir Benjamin Baker is the engineer of this great erection, which, when finished, will have a height of 1150 feet, or 176 feet more than Eiffel's tower in Paris.

The Manitoba Government has issued its official bulletin regarding the crops of that province, which in all sections are reported as excellent. The estimated yields are given as: Wheat, 22,000,000 bushels; oats, 16,000,000 bushels; barley, 4,000,000 bushels; and flax, 150,000 bushels.

An international agricultural exhibition is being arranged in Vienna for April, May and June, 1894.

Talk of an underground system of rapid transit for New York is cropping up again.

A corporation with a capital stock of \$500,000 was chartered at Trenton, N. J., last week for the purpose of damming the Delaware River near Trenton to secure power for the operation of a large electric plant to supply power to Trenton and Morrisville. The title of the corporation is the Pennsylvania & New Jersey Power Company.

Last week was one of terrible disasters in the East and South. Two railroad accidents, entailing lamentable loss of life, occurred in Long Island and Massachusetts, and one of the greatest storms that has ever visited our coasts carried death and destruction along the Southern Atlantic States.

The West Indian cyclone of last week caused unprecedented damage to telegraph and telephone wires in the Eastern and Southern States. For two days news was almost unobtainable in New York from the stricken districts of the South, while for some hours of one morning the only medium of telegraphic communication with Chicago and St. Louis was over a single wire.

The new United States cruiser "Olympia" had her first trial trip on the bay at San Francisco on Thursday. Everything is reported as having been satisfactory and it is expected that more than the contract 20 knots will be obtained from the vessel when the official trial is made.

Negotiations between the governments of Japan and Mexico in regard to the introduction of Japanese labor into the latter country have been carried to a successful issue. Japan will permit her people to emigrate to Mexico, whose Government will, in turn, guarantee them protection. They are needed for employment in the coffee, sugar and cotton plantations of the Republic, as well as in the mines and factories.

The Baltimore *Sun* states that four steamers laden with an aggregate of 13,000 tons of iron ore from Santiago, Cuba, were discharging at Sparrow's Point, Md. It is said that the Maryland Steel Company will store 40,000 tons of ore in bond, and unless business becomes more active the company will work upon what is stored, which means a temporary curtailment of imports.

Scrap-iron dealers in Boston are agitated over the threatened action of the Navy Department in discontinuing the use of scrap iron for the manufacture of chain cables at the Boston yard, ow-

ing, it is said, to tests made having proved that chains made from scrap are inferior in tensile strength to those made from new bar iron.

The discovery of an oil well at Akron, Ohio, has caused much excitement and speculation in that vicinity.

The Commissioner of Patents has refused an application for a trade-mark, applied for by Governor Tillman of South Carolina, for whiskies dealt in by the State, on the ground that the State has no right to trade in liquors, except within its own limits, and is therefore not entitled to a registered trade-mark.

Arrangements are being made by the Federal immigration authorities for the establishment of inspecting stations at various points on the Canadian frontier in order to maintain a more efficient system for the inspection of immigrants coming to the United States by way of Canada.

According to a table, prepared by the Director of the United States Mint, of the monetary systems of the world, and the approximate stocks of money in the aggregate and *per capita* in the principal countries, the aggregate stock of gold coin now in existence is \$3,582,605,000; silver, \$4,042,700,000, and uncovered paper, \$1,635,873,000. The stock of gold and silver possessed by the five principal countries is given as follows:

	Gold.	Silver.
United States.....	\$604,000,000	\$615,000,000
Great Britain.....	550,000,000	100,000,000
France.....	800,000,000	700,000,000
Germany.....	600,000,000	211,000,000
Russia.....	250,000,000	60,000,000
India.....		900,000,000
China.....		700,000,000

Of the uncovered money, South America has \$600,000,000; Russia, \$500,000,000; the United States, \$412,000,000; Austria, \$260,000,000; Italy, \$163,000,000; Germany, \$107,000,000; France, \$91,000,000; Great Britain, \$50,000,000.

PERSONAL.

A person who is soliciting aid in this country is representing himself as a son of the famous ironmaster, Sir Lowthian Bell. John Fritz of the Bethlehem Iron Company has received a cable dispatch from Sir Lowthian Bell, under date of August 30, stating that the person in question is no relation of Sir Lowthian Bell.

C. M. Schwab, who has heretofore been general superintendent of the Edgar Thomson Steel Works, Bessemer, Pa., and the Homestead Steel Works, Homestead, Pa., will in the future give his entire attention to the Homestead Steel Works. James M. Gayley has been made general superintendent of the Edgar Thomson Steel Works and Blast Furnaces.

Henry Bauerman, professor of metallurgy at the London School of Mines, a juror at the World's Fair, returned to England this week.

R. A. Hadfield, the well-known Sheffield steel maker, has sailed for home.

W. Schneider of the family owning the Creusot Works, France, is with the party of French engineers now in New York.

Among the recent arrivals from Europe were Andrew Carnegie and Henry Phipps, Jr.

Horace E. Burt, formerly the manager of the York Iron Company, has

returned to his profession as a lawyer, establishing himself in the Guaranty Loan Building, Minneapolis, Minn.

The Duquesne Tube Works Company.

At Pittsburgh last week application was made to the courts to have the property of the Duquesne Tube Works Company of that city taken out of the hands of the assignee. The company have secured an extension from their creditors and want to resume business. The agreement provides that the company shall pay \$23,000 to the Tyrone Iron Company by September 1, 1893. They shall also execute a mortgage on their plant to secure \$100,000 of their bonds, of which \$40,000 worth are to be given to the Tyrone Company and \$60,000 worth to W. A. Dunshee. A second mortgage is to be given to secure a further issue of \$100,000 of bonds to mature in five years. The bonds bear 6 per cent. interest, payable semi-annually. The second issue of bonds is to be given to unsecured creditors. If default is made in the payment of interest the whole of the indebtedness becomes due and collectible in 60 days. The unsecured creditors agree to accept 10 per cent. of their claims, without interest, every six months, commencing February 1, 1894, and ending August 1, 1898. The company shall also give a judgment note to W. F. McCook, as trustee for the unsecured creditors, for the aggregate amount of the extension notes, to better secure the payment of the notes. In default of payment of the extension notes as they become due the trustee can issue execution on the request of the holders of \$25,000 worth of the notes. The unsecured creditors shall have the right to elect three members of the board of directors of the Tube Works Company for the five years of the extension. The whole number of directors is five. To give the creditors such right the stockholders shall assign a majority of the capital stock to be held by H. B. Shields as trustee. They, however, must choose as directors A. W. Thompson, J. M. Bailey and W. C. Frick. The court fixed September 18 for a hearing on the application.

The longest steel plates ever used in the construction of transatlantic tonnage are now, reports an English trade journal, being put in the new steamers building for the Chesapeake & Ohio Steamship Company of London, by Furness, Withy & Co. of West Hartlepool, England. These plates are 60 feet in length by 4 feet to 4 feet 3 inches in breadth, making only one butt joint in a strake of 120 feet, 32 feet plates having been in ordinary use hitherto. They were handled with ease. Lloyd's surveyors are much pleased with the constructive work as shown in the long plate system.

The Society for the Encouragement of French Industries is offering three prizes, open to the world, for treatises on technical subjects. They are of \$300 each and will be awarded in 1894. The subjects in competition, which cover a sufficiently wide field, are: 1, for a published work of use to the chemical or metal trade; 2, for an experimental study of the physical and mechanical qualities of one or several metals or alloys chosen from those in ordinary use; and, 3, for a scientific examination of any industrial process of which the theory remains imperfectly known.

The Iron Age

New York, Thursday, September 7, 1893.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Impending Scarcity But no Boom

The disordered state of trade through which we are now passing is leading to some peculiar results that are worth noting. Branches of business in which stocks are periodically accumulated to meet heavy demands, according to the season, will be seriously disorganized by the heavy curtailment in production which has been forced alike on the establishments with abundant capital and those with but slender resources. The shrinkage of output as compared with normal periods has been enormous. In the stove trade, for instance, those who have the best facilities for gathering information estimate that in July and August about three-fourths of the stove producing capacity of the country was inactive. The reduction in output was not less than 10,000 stoves daily, making an aggregate shrinkage of at least 500,000 stoves in the stocks which in ordinary seasons would be in makers' and dealers' hands at this time of the year. The financial stringency struck the stove trade just at the time when makers are driven, endeavoring to accumulate heavy stocks for their period of most active sales. Among makers of agricultural implements the same serious interruption to the business of great establishments has occurred. Manufacturers of hardware have been forced to suspend in the same way, regardless of the necessity of carrying full stocks in their warehouses to meet the certain requirements of jobbers and consumers. Inconvenience is even now experienced in securing full assortments of goods in some lines.

Granting that the purchasing power of the people may be restricted quite considerably, there will be some demand for goods that must be met. Wear and tear and waste go on and consumption never completely stops. The very heavy curtailment in production has been carried by the financial stringency far beyond the limits of a mere trade depression caused by overspeculation or overstocks. This has deranged the whole chain of distribution, so that temporary scarcity of many kinds of commodities seems inevitable. It has already occurred in the sugar trade in many localities. The same influences curtailed production and the accumulation of stocks in that line as all others, and, now that the season of an enlarged consumption of sugar has set in, there is a sudden scarcity. There may be no sugar famine and prices may be

kept down as a matter of policy at this time, but considerable inconvenience is experienced and merchants are harassed by the appeals of their customers for more than can be spared if every one is to get a fair share.

The closing of so many rolling mills is already causing trouble among certain classes of consumers. They are unable to get the exact shapes, sizes and lengths they need, and are hindered in construction which they are extremely anxious to push to completion. On this account some complaint is made that mills are being closed for effect and not because of the slack demand. The fact is overlooked that the aggregate of such business is now small and that mills will not start up nor put in special rolls merely to make a few tons. The railroad companies that have deferred purchasing rails for renewals, but must do some repairing of track before winter sets in, are likely to find themselves unable to get rails just when they want them, now that all the rail mills are shutting down, with the prospect of remaining closed until well along in the new year.

It will be strange, indeed, if the restricted output of Lake Superior iron ore this season is not felt by the Northern iron trade before navigation opens next spring. The falling off in shipments from the mines has been so heavy that the stocks of unsold ore at lower lake ports will be very light when winter sets in. The production of pig iron will not be wholly suspended, nor will the demand long continue as light as at present. Stocks will be drawn upon, and before spring not a few furnacemen will be looking for ore and finding none available.

The presentation of such statements as the above might be deemed preliminary to the prediction of a boom in prices, but it is almost certain that there will be none, even if a decided scarcity of commodities and raw materials should be perceived on all sides. Consumers are not and will not for a long time be in a position to pay a premium on their purchases. They will expect to buy at low prices or they will go without the article needed. Scarcity is not the only requirement for a boom. There must at the same time be an easy financial condition and a fair degree of confidence in the future. These elements are lacking now and are not likely to be of very rapid growth. It will take longer than a few months to get back to where we were even in the uneasy times of last April and May.

The great labor congress held in Chicago last week was well attended by "reformers" of more or less eminence from many countries. The symposium of labor theories, however, failed to crystallize into any practical measures for the real benefit of workingmen. There were plenty of so-called economists, with all sorts of schemes guaranteed to usher in the millenium, if they could only be universally adopted, but the trouble with nearly every

theory propounded was that existing forms of government or existing institutions of society would have to be completely overturned first. A profound truth was uttered by Bishop Fallows of Chicago, when he asserted that in this country there is no class and no distinction between classes and masses, but the trouble is that his hearers have been educated or have educated themselves to think otherwise, and he probably made no impression on them. They regard workmen as a distinct class and think that it is possible to do something to better their condition in the lump. The great fact is ignored that every man must work out his own salvation. If he would rise, he must simply work and save.

Smokeless Powders.

Much attention is now being paid to the search for a smokeless powder of American invention for use both in magazine small arms and in heavy guns. Briefly, the qualities sought for may be enumerated as follows: It must have a progressive rate of burning so as not to exert undue pressure and with a comparatively low pressure to obtain the greatest muzzle velocity; it must be permanent so as not to be affected by time or by atmospheric changes, and it must be uniform in quality in order that like results under like conditions can always be obtained.

The question of the rate of burning is one of the most important, since upon it depend the velocity and pressure. Why this is the case is readily understood. If the explosion of the charge is instantaneous the gun is at once subjected to the maximum pressure and the projectile is driven out by a constantly decreasing pressure due to the expansion of the gases as they follow the projectile and fill the bore. It is therefore evident that with quick-burning powders the strength of the gun controls the velocity of the projectile, and since a certain pressure must not be exceeded the velocity cannot, with such powders, be increased. The explosive acts upon the projectile as a blow, and although the effect is continuous until the projectile leaves the gun, it is the initial excessive pressure that is dreaded.

On the other hand, the factors of the problem are changed when slow-burning powder is used. In this case the projectile is started with a comparatively low pressure, and is pushed forward by a regularly increasing—instead of decreasing—pressure, the aim being to obtain the maximum at the instant the shot leaves the muzzle. Although the gun is not strained with this powder to the same degree that it is with the quick burning, and consequently there is much less injury done to it at each discharge, the muzzle velocities are far greater with progressive-burning powder than have ever been reached with the other.

The rate of burning, or, in other

words, the time required for complete explosion, is an important element. The aim is to procure a rate of burning which shall be continuous while the projectile is in the gun. If complete explosion takes place before the muzzle is reached, then the projectile for a certain portion of its passage is forced by a decreasing pressure; and if combustion continues after the projectile has left the gun, then there is a waste.

The recent tests at Sandy Hook of the Leonard smokeless powder show the wonderful properties of these powders. With the new regulation army field piece of 3.2-inch caliber an initial velocity of 2430 feet was obtained, while the 5-inch segmental wire gun gave the extraordinary velocity of 2365 feet, the pressure being 46,800 pounds per square inch. Looking at what has been done with other powders we find that the Monroe powder, made at Newport for experiments in naval guns, gave a velocity of 2100 feet with a pressure of only 14 tons in a 4-inch rapid-fire gun. In a 5-inch gun a velocity of 2540 feet was reached with a pressure of 15.2 tons. It is not too much to assume that velocities of 3000 feet and perhaps more will soon be obtained.

The Form of Propellers.

A paper by J. J. O'Neill, published in the last issue of "Proceedings of the United States Naval Institute," deals with the question of the effect of alterations of propellers upon the speed of vessels. "Whether success results from either alteration of diameter or pitch, or both, is alike a mystery. This is an undesirable state of things, and if I am able to show the variations in speed obtained with different propellers, power being constant, on a given ship under precisely similar conditions, in which these variations can be assigned to their true cause, something will have been gained."

The value of reliable data obtained from carefully conducted experiments cannot be overestimated. In the opinion of the author this can only be obtained by a systematic trial of screws on a given ship in which one factor alone varies. It is suggested that trials be made with a pitch ratio of 1, and that the pitch be varied by $\frac{1}{16}$ until the ratio of 1.5 has been reached, the diameter remaining the same during all these trials. Then reverse the process by changing the diameter, and keeping the pitch constant. This would give ten curves showing the variations due to the alteration of each factor, and would permit of the selection of the best propeller for that particular vessel. It is stated that it will then be found that a point exists, which it is proposed to call the neutral point, where any of the propellers experimented with are of equal value for speed purposes; but that one alone is desirable where efficiency of machinery is considered, less wear and tear and consequent prolongation of life obtaining when the revolutions are the least

possible. Below the neutral point a large propeller running slowly is most efficient, while above that point a small, quick running propeller is desirable for speed efficiency. The only question then is to determine the speed at which the conditions change. Although this varies with the type of vessels, in ships of usual form, ranging from 3,000 to 9,000 tons displacement, it is $16\frac{1}{2}$ to 18 knots respectively. The variation is very slight in the case of vessels between these limits.

The method of calculating the necessary powers of varying speed, based upon other similar vessels' performances, but whose propeller elements may be very dissimilar, is entirely unreliable. The case is cited of the "Philadelphia" and "Baltimore," which have the same displacement, draft and propellers, and yet the latter develops 15 per cent. more power on three revolutions per minute less, and secures an increase of speed of four-fifths of a knot.

"Everything, therefore, points to the necessity of tank experiments, in which not only the model of the vessel but of the screws should be put through a series of carefully conducted experiments at varying speeds, plotting results, and then finally running the actual vessel under similar conditions and comparing the theoretical with the practical curve, the difference giving the efficiency of machinery. When this has been done for varying types and the machinery efficiency determined, the prediction of results will be comparatively easy."

The "New York" obtained 21 knots with 136 revolutions, developing about 17,000 horse-power. It is stated that "the 'New York's' dimensions warrant the assertion that its efficient speed with the power developed is 22 knots, and the non-attainment of this should induce us to seek the cause: A reduction of diameter of propeller and increased pitch is the solution." Concerning the "Columbia," which is expected to make 21 knots, it is said that small propellers will be undoubtedly found best, and that with these, other things being equal, 23 knots can be made. It is asserted that similar increase in speed of other vessels could be obtained with suitable propellers run at the proper speed. In the opinion of the writer, the object in designing ships should be to secure the maximum effect on a minimum power and revolutions. The propeller is thought to be the principal factor of the machinery.

The output of minerals in New South Wales in 1892, according to recently published returns, was of the value of \$25,467,898, which, although a decrease on the yield of 1891, was greater than that of any previous year. The production of the principal minerals was as follows: Gold, 156,870 ounces, value \$2,732,050; silver, 350,661 ounces, value \$273,043; silver lead and ores, 133,354 tons, value \$10,820,569; coal, 3,780,967 tons, value \$7,019,462; and copper, 4834 tons, value \$900,989.

CORRESPONDENCE.

The Regulation of Temperature in the Converter.

To the Editor: In your issue of August 31 appears a letter from John E. Fry relative to an "article by H. H. Campbell as published in *The Iron Age* of 24th inst."

The remarks of Mr. Fry are valuable and interesting. Moreover, they are strictly correct in the narration of facts. Nevertheless it becomes necessary for me to reply; for the long experience and the reputation of the writer render his words authoritative, and to the casual reader it would appear that there is a disagreement between us. Such, however, is not the case. By consulting *The Iron Age* of August 24 it will be found that the article there printed is not written by me, but that it is an abstract of a paper which I presented at the World's Congress at Chicago. The abstract is a very good one and covers the main points very well, but no abstract can possibly introduce all the explanations, limitations and illustrations of the original. The paragraph in the synopsis bearing on this subject contains about 200 words. The original devotes twelve times this space to the point in question. In all this matter it is impossible to find it stated that the Bessemer blower does regularly and always scrap his heats within 100 pounds of the right amount. It is stated, however, that an error of 500 pounds gives a very hot or a very cold heat, and that an error of 200 pounds is the greatest error allowable in good practice. It must be acknowledged that this last phrase is ambiguous. It is certainly not meant that a good scrapper never makes such an error, for cold heats and hot heats are known in every mill; but it is meant that a competent man will get the heats within these limits whenever his calculations are not overthrown by unknown conditions; and it is also meant that such an error will show itself in the pit in some one of the many disagreeable incidents so vividly enumerated by Mr. Fry.

In this connection it should be mentioned that the weight of the heat is 15,000 pounds. This is clearly stated in the original article. On such a charge it is stated "that the difference caused by a variation of 100 pounds either way in such an addition can be seen by the naked eye." These are the exact words of the article. On closely considering them it will be evident to Mr. Fry that he has very ably and thoroughly thrashed a man of straw. I have nowhere said that a blower could always scrap his heats within that limit. With direct metal it is harder to attain success than when the pig iron is thoroughly selected and mixed by melting through cupolas. With the changing of bottoms and delays from various causes there is opportunity for many errors of judgment, but this has absolutely no bearing upon the statement above repeated. It often happens in our American practice when using remelted metal that 30 or 40 consecutive heats will be made from a pair of vessels without a minute's delay or a change of bottoms. If this happens when the iron is running regular, the scrap may remain during the whole time between, say, 400 pounds and 700 pounds per heat. There may be even less change than that. Under such circumstances it is possible to clearly notice the effect that is caused by an extra 100 pounds. In the case of any

one heat it would always be open to question whether some unlooked for variation in other conditions had not by accidental coincidence produced the change which we attribute to the scrap. When, however, this agreement of results with our calculations occurs regularly in heat after heat, when it occurs day by day and month by month, the certainty of the conclusion can be disputed only by the casuist.

In making this statement I am not publishing any hearsay evidence. I have scrapped and poured many thousand Bessemer heats. I have made some mistakes; there were cold heats and there were hot heats. Combinations of changes in iron with alterations of cupola and vessel conditions sometimes made problems beyond my ken; but nevertheless I claim that at that time, by using blue glasses alone, and looking only at the steel as it was poured from the vessel into the ladle, I could tell the change in temperature caused by a variation of 100 pounds of steel scrap. In saying this I claim no greater skill than I grant to some who worked with me, and to many others who in the various plants of our country are "earning their bread by the sweat of their brow."

H. H. CAMPBELL.

STEELTON, PA., September 1, 1893.

Basic Open-Hearth Practice.

To the Editor: I have read with great interest the very able paper contributed by Mr. Campbell of Steelton to the members of the American Institute of Mining Engineers. I think, however, there are several statements made which are somewhat debatable. The duplex process is now acknowledged to be very attractive theoretically, but commercially of no value whatever. It is very questionable whether, in the process of oxidizing the silicon sufficiently so as the metal could be charged in the open hearth low enough in Si for good working purposes, too much carbon would be eliminated, thus causing the metal to run thick and skulling in transfer ladles, &c. However, the loss incurred in the oxidation of the silicon is sufficient to condemn desilicizing by a Bessemer converter.

I presume Mr. Campbell, when he states that an addition of 500 pounds scrap in an open hearth will cause skulling in the ladle, means that the addition to have such an effect must be made when the carbon is practically boiled down. Being an open-hearth melter I myself, personally, should not hesitate to add 500 pounds of scrap in a 15 ton heat, provided that the carbon in the bath was not below 0.50. I must also profess to some scepticism as to the perceptible reduction in temperature "to the naked eye." Mr. Campbell evidently is of the opinion that a rammed magnesite hearth is the ideal one for the basic process. I think that a burnt magnesite is far preferable to anything as yet tried, and the extra cost incurred in putting it in, in the first instance, is more than counterbalanced by the extra wear and results gained by using it. In building a basic open hearth I should certainly burn in a magnesite bottom and fettle with calcined dolomite. I cannot agree in the statement that "there is no advantage in reserving part of the lime for a later addition," neither in the idea of carefully charging the pig iron and lime so as to prevent the silica attacking the lining. My experience has taught me that it is best to charge about one-half of the limestone required in the heat on

the bottom, so as to get the slag liquid as soon as possible, and that judicious feeding of lime is readily absorbed by the slag without much perceptible reduction in the temperature of the bath, and so keeping a slag which will allow the decarbonization and dephosphorization to go on without running the furnace at an extremely high temperature to liquefy the limestone as soon as the charge is melted. I also found that charging the limestone on the bottom and also a fair proportion of oxide of iron helped in a great measure the dephosphorization and desulphurization of the charge, and have observed that a mixture analyzing 0.090 sulphur will be reduced to 0.05. There is no doubt that the tilting furnace has a good future, as at times it would be extremely convenient to get rid of a siliceous slag that occasionally is to be found in a basic open-hearth furnace through bad workmanship and other causes. I quite agree with Mr. Campbell in his statement that if an attempt is made to keep down the lime on a high-phosphorus mixture it will take longer to dephosphorize, and that, too, such a procedure invariably produces wild metal—that is, if the heat is required for low-carbon orders.

With regard to the reduction of sulphur, I think this can be counted upon as a certainty. As mentioned before, I have always noticed a reduction of sulphur when a slag was formed rather higher than usual in oxide of iron. I do not think that this will be found to be unconfirmed by others who have interested themselves in this line. My experience has been that with a high-carbon melt the better dephosphorization is got. In working the open-hearth furnace at Birmingham, Ala., on the experiments made in connection with the Talbot process, I invariably noticed that the phosphorus at 0.50 carbon was as low as, if not lower than, the tapping sample. This was not due to the slag getting too high in silica later, and thus rephosphorizing the metal, as I watched that point carefully. As in the 20 heats worked there the charges consisted totally of desilicized iron, containing between $2\frac{1}{2}$ and 3 per cent. C and 0.70 phosphorus, I cannot quite see that the oxidation of the phosphorus does not take place just as readily in a high-carbon melt as in a correspondingly low one.

I should imagine that rephosphorization takes place when the slag contains more than 22 per cent. silica, and the higher the slag is in P_2O_5 the more phosphorus will reappear in the steel. But I think that with a slag containing a slighter excess of oxide of iron than usual, and not higher than 10 per cent. P_2O_5 , the presence of the oxide would prevent any rephosphorization whatever, even if the slag contained as high as 27 per cent. silica. I am not sufficiently advanced in metallurgy to quote theoretical reasons, as my experience has been essentially practical. Yours truly, WILLIAM H. TALBOT.

BUFFALO, September 2, 1893.

Industrial matters at the new city of Ellwood, Pa., are quiet at present. The Hartman Mfg. Company, makers of steel wire goods, are running their works, other concerns are in partial operation and the works of the Ellwood Steel Company are idle. The latter plant consists of four sheet mills. During the past few months many additions and improvements have been made, consisting of two double annealing furnaces, two 10-ton steel cranes, a

complete system of narrow gauge railroad tracks and a new warehouse. It is expected that operations will be resumed in the near future.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., September 5, 1893.

A great deal of stress has been laid upon the fact that the Committee on Ways and Means, in submission to much public pressure, decided to abandon their star chamber proceedings in dealing with the tariff, and would give hearings to representatives of important industries. In making this concession they limited these hearings till the 20th. As the hearings do not extend beyond five hours at a sitting, and as two Sundays come out of the limit, the net time would be about 90 hours.

While the parties desiring to be heard will be able to state their cases, the bill which the committee have in hand is far on the way toward completion. The committee have decided the general line upon which the bill will be constructed, and from this they will not deviate, hearings or no hearings. Free raw materials is the foundation of the scheme. This includes iron ore, coal and wool as a foundation. Other articles will be introduced, but these are the most important at present. It is also their purpose to cut down the duties very sensibly upon all articles into the manufacture of which these raw materials enter.

From the general talk of the ultra wing of the majority, which is not harmonious on the abstract principle which should govern the course, the severest reductions will be made in the iron and woolen schedules. It is even declared by them that pig iron could be reduced to \$4 and steel rails to \$5 or \$7 a ton, and still be able to compete with the foreign product. The American Iron and Steel Association, before the committee decided to give hearings, filed a pamphlet against the proposed change in the metal schedule as assumed was the purpose of the majority of the committee. They will be formally heard about the 11th. The pamphlet submitted presented the interests of iron and steel and the manufacturers of articles in these metals in a concise but persuasive form. The representatives of the association and the industries involved will elaborate on this. In the designation of the sub-committees the States of New York and Pennsylvania, the largest manufacturing commonwealths, are unrepresented on the one most directly charged with the arrangement of the schedules, that of customs. The personnel of that sub-committee is Nelson of West Virginia, Whiting of Michigan, Breckinridge of Arkansas, of the majority, Messrs. Reed of Maine and Burrows of Michigan representing the minority.

The internal revenue branch has been assigned to Messrs. McMillin of Tennessee, Montgomery of Kentucky, Bynum of Indiana; and of the minority, Hopkins of Illinois and Payne of New York. The administration of customs laws has been assigned to Turner of Georgia, Stevens of Massachusetts and Tarsney of Missouri, Payne of New York and Gear of Iowa representing the minority. The public debt in tariff reform is to be handled by Bryan of Nebraska, McMillin of Tennessee and

Whiting of Michigan; and Burrows and Dalzell for the minority.

On reciprocity and commercial treaties, Cockran of New York, Bynam of Indiana and Tarsney of Missouri are from the majority, and Gear of Iowa and Dalzell from the minority.

The applications for hearings are swelling, but these are grouped under classes and will be required to bring their remarks down to a minimum.

The majority of the committee are not a unit on the extreme policy advocated by the chairman. Messrs Whiting of Michigan, Stevens of Massachusetts and Cockran of New York have served notice on their colleagues that they do not propose to be parties to a reckless raid upon the industries of the United States, and if insisted upon they will be compelled to take issue with them.

Mr. Stevens of Massachusetts, for instance, remarked to-day: "I do not intend to permit, if I can prevent it, a wholesale attack upon our industries. There are certain features of the existing tariff which require amendment, but when it comes to crippling American industries I am opposed to that."

The extremists are the chairmen, Mr. Nelson of West Virginia, McMillin of Tennessee, Turner of Georgia, Montgomery of Kentucky, Bryan of Nebraska, Breckenridge of Arkansas, Bynam of Indiana and Tarsney of Missouri. In general committee on such an issue the three conservatives with the minority vote would prevent action in committee hostile to home industry.

Ryland's Iron Trade Circular gives the accompanying comparative table of

companies which 15 or 16 years ago were paying an insurance of 10 or 12 per cent. for their vessels, while at the present time they paid only 4 to 5 per cent.; while the loss of life in ocean-going passenger ships during the past ten years has been reduced by one-half.

The Tin-Plate Ruling.

(By Telegraph.)

WASHINGTON, September 6.

The following is the text of Secretary Carlisle's official letter to Special Agent Ayer, changing the policy of the Department in the computation of tin-plate production under the tariff act of 1893:

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., September 4, 1893.
COL. IRA AYER, Special Agent,
New York, N. Y.

SIR: By this mail will be returned to you the statements of tin-plate manufactures comprising the quarter ending March 31, 1893, which were transmitted by you to this Department in accordance with instructions.

You are informed that after careful consideration of the matter the Department has come to the conclusion that the word "produced," which appears in the second proviso of paragraph 143 of the tariff act of October 1, 1890, was intended by Congress to exclude from the computation of results all tin plates made from imported black plates.

While, for the sake of uniformity in the reports of the fiscal year 1893, you will construct your abstract and report of the last quarter's transactions upon the same assumption as regards black plates as has governed reports of the preceding quarters of the year, you are instructed to prepare an ap-

cision." With this view it is proposed to print the report of the last two quarters, together with the required revisory appendix.

OBITUARY.

ERNEST V. CLEMENS.

Ernest V. Clemens, superintendent of the De La Vergne Refrigerating Machine Company, foot of East 138th street, New York, died at his residence in that city on the 3d inst. of pleuropneumonia after a short illness. Mr. Clemens was born at Waterbury, Conn., April 3, 1855, and was, therefore, only 38 years of age at the time of his death. At an early age he served an apprenticeship in the pattern shop, foundry and machine shop and drafting room of the Farrel Foundry & Machine Company, at Ansonia, Conn., where he afterward became assistant superintendent. He designed and erected for them a complete sugar plant in Cuba, and he was well known among those controlling sugar plantations in that and other countries. Mr. Clemens also designed and superintended the erection of mining machinery, converters, iron, rubber, paper, brass, copper and grain rolling machinery and general engine and mill work. At an early age he was appointed foreman of the pattern shop and head draftsman of the Farrel works, and later he became superintendent of the National Machinery Company of Tiffin, Ohio. Afterward he returned to the Farrel works as assistant superintendent. Prior to his connection with the De La Vergne works Mr. Clemens conducted a foundry and machine shop business at Ansonia under the style of the Clemens Foundry & Machine Company. He had been superintendent of the De La Vergne plant for five years, and to his skill and judgment are due in no small degree the development of that establishment. He designed the new erecting shop and brass foundry recently erected at these works, the general arrangement of which was shown in *The Iron Age* at the time and commanded considerable approval. Mr. Clemens made a specialty of engines and refrigerating machinery and at the time of his death was consulting engineer for the Central Forge Works.

The deceased was a man of more than ordinary popularity in his profession. He was a member of the American Society of Mechanical Engineers, the American Society of Civil Engineers and the Engineers' Club. He had held office in two of these societies. Mr. Clemens was held in high esteem by his associates, who lose by his death a valued friend and adviser.

The Chicago Tin Plate Company have just completed a tin plate plant at Wentworth avenue and Fortieth street, Chicago, turning out their first product on the 30th ult. They propose to develop their producing capacity to 1000 boxes per week. They purchase the black plates, but intend to add rolling mills in the course of time to make their own plates. The officers of the company are J. E. Jones, president, and W. D. Lewis, vice president. The product of the works is sold by George Nash, 210 Lake street, Chicago.

M. Nicolas François of the Cockerill Company, Seraing, Belgium, is now in Chicago.

Year	Schoot-Warrants.			Middlesborough-Warrants.			Hematites-Makers' Prices.		
	Highest.	Lowest.	Average.	Highest.	Lowest.	Average.	Highest.	Lowest.	Average.
1872..	137-6	73-	102-	115-	69-6	93-8	190-	95-	150-6
1873..	145-7	101-	117-3	122-6	83-6	105-6	190-	155-	180-6
1874..	108-6	72-6	87-6	85-	60-	67-6	155-	90-	117-1½
1875..	75-	57-6	65-9	60-	48-	53-6	90-	75-	80-9
1876..	66-6	54-	58-6	53-	45-	47-4	75-	67-6	70-9
1877..	57-9	51-6	54-6	46-6	40-	41-10	67-6	65-	66-6
1878..	52-4	42-3	48-5	40-	35-	39-	65-	60-	61-1½
1879..	61-6	44-6	47-	52-6	32-6	39-3	92-	47-	45-4
1880..	72-	44-6	54-6	63-	35-9	44-8	115-	58-	74-9
1881..	53-7	45-3	49-1	43-3	36-1	39-1	62-6	53-	58-6
1882..	52-9	46-8	49-4½	44-7½	41-3	43-4	63-	51-	54-3½
1883..	49-3	42-11	46-9	43-6	36-3	39-6	54-	46-	49-7
1884..	44-7½	40-10	42-1½	37-6	36-3	36-8	46-	44-6	44-9
1885..	43-11½	40-7½	41-10	35-6	31-6	32-10	44-6	42-	41-7
1886..	44-5	37-11	39-11	35-	29-	30-7	44-	42-	42-10
Warrants.									
1887..	47-8	38-5½	42-3	38-3	31-3	34-	50-	40-9	44-4
1888..	43-6	37-1	39-11	34-9	30-9	32-8	45-10	40-9½	43-3
1889..	64-10½	40-10	47-9	63-9	33-3	43-9	76-9	44-0½	54-6
1890..	65-3	43-4	49-7	65-3	39-7	47-9	80-6	50-2	57-8
1891..	59-	42-1½	47-2	41-8	37-7	40-1	53-8	47-	49-3
1892..	47-1½	39-6	41-10	45-	35-1	33-6	52-2½	45-2	48-6

prices of pig iron in England for the last 21 years.

The chairman of the P. & O. Steam Navigation Company, who possess the finest fleet of passenger steamers in the world, speaking at the late International Maritime Congress in London, mentioned some striking facts demonstrating the improvement which had taken place within recent years in ocean passenger vessels. Fifty years ago, he said, the records of the first vessel employed by his company, namely, the "Iberia," showed that for each ton of coal consumed that vessel was able to propel a displacement of only 17 tons at a maximum speed of 8 knots, while seven or eight years ago the company built a vessel which was running at the present time, and which propelled 100 tons of displacement for each ton of coal consumed, and at a speed of 16 knots. As to safety, he knew of some

pendix showing the results of the year's domestic production of tin plate, excluding therefrom tin plates made from imported plates, as already explained. You will also report the facts relative to the manufacture of domestic black plates during the last fiscal year. This appendix is to form part of your annual statement of results.

Respectfully yours,
(Signed) JOHN G. CARLISLE,
Secretary U. S.

Secretary Carlisle, speaking of this action, says: "The only thing in it is that a former administration of this Department decided to include foreign plates tinned in the United States as domestic product for computation under the proviso of the act of 1890, and the Department has now reversed that decision, and only tinned black plates of home production will be included in the computation in the future under the limitation period of the present rate of duty. The report for the fiscal year ended June 30, 1893, will be made to comply with this de-

A Further Decline in Pig Production.

88,500 Tons per Week since June 1.

The extraordinary reduction in the output of pig iron which has taken place since the financial panic progressed during August and has now reached a point when further cutting down will be relatively small. It is true, however, that since the opening of this month a further restriction has taken place, and that orders to blow out, notably in the Lebanon Valley, are sure to be given at an early date. We are now producing iron at a rate just about one-half of that which may be considered normal, or in other words are making only at the rate of 4,500,000 tons a year, instead of 9,000,000 tons. Our stock returns, which are on'y partial, show a slight increase in the holdings of anthracite and charcoal iron, but a large accumulation in coke pig. The latter, of course, is due chiefly to the idleness of rolling mills and steel works. It could be quickly swept away by even a partial resumption.

On August 1 the active furnace plant, grouped according to fuel used, possessed the following weekly capacity:

Fuel.		
Anthracite.....	45	21,168
Coke.....	58	59,076
Charcoal.....	29	5,263
Total, September 1.....	132	85,510
Total August 1.....	169	107,042
Decrease.....	-37	-21,532

The weekly product of all the furnaces on August 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
September 1, 1893.....	132	85,510
August 1.....	169	107,042
July 1.....	220	158,762
June 1.....	244	174,029
May 1.....	251	181,551
April 1.....	255	178,858
March 1.....	255	176,478
February 1.....	251	171,201
January 1.....	246	178,068
December 1, 1892.....	246	176,271
November 1.....	244	171,042
October 1.....	236	158,027
September 1.....	236	151,648
August 1.....	238	155,136
July 1.....	254	169,151
June 1.....	269	173,674
May 1.....	268	177,886
April 1.....	280	185,462
March 1.....	305	193,902
February 1.....	308	187,383
January 1.....	305	188,082
December 1, 1891.....	298	186,135

The position of the charcoal furnaces was as follows:

Charcoal Furnaces, September 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	13	6	450	7	510
New York.....	5	1	95	4	490
Pennsylvania.....	13	1	45	12	870
Maryland.....	6	2	118	4	300
Virginia.....	13	0	0	13	827
Ohio.....	9	3	248	6	329
Kentucky.....	3	1	81	2	200
Tennessee.....	8	2	1,751	6	396
Georgia.....	3	1	283	2	320
Alabama.....	13	5	1,350	8	1,890
Michigan.....	20	3	1,203	17	5,111
Missouri.....	2	1	380	1	293
Wisconsin.....	4	1	746	3	1,127
Texas.....	4	1	143	3	560
Washington.....	1	0	0	1	100
Oregon.....	1	0	0	1	226
Totals.....	118	29	5,263	89	13,558

As compared with previous months, the record of active charcoal furnaces stands as follows:

	Furnaces in blast.	Capacity per week.
September 1, 1893.....	29	5,268
August 1.....	34	5,563
July 1.....	35	7,422
June 1.....	34	8,034
May 1.....	38	8,595
April 1.....	38	8,729
March 1.....	36	8,623
February 1.....	37	8,934
January 1.....	38	8,865
December 1, 1892.....	41	9,509
November 1.....	42	9,540
October 1.....	39	9,174
September 1.....	42	9,657
August 1.....	41	8,331
July 1.....	42	9,364
June 1.....	48	11,613
May 1.....	40	10,100
April 1.....	44	10,859
March 1.....	50	11,734
February 1.....	49	10,991
January 1.....	48	11,164
December 1, 1891.....	52	11,033

There have been blown out during August Copake in New York and Bloom and Madison in Ohio.

The capacity active among the coke furnaces is summarized below:

Coke Furnaces, September 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	7	1	1,300	6	3,917
Pennsylvania.....					
Pittsburgh district.....	25	15	23,969	10	16,017
Spiegel.....	1	1	0	1	1,000
Shenango Val.....	16	2	1,748	14	12,654
Junata and Conemaugh Valley.....	16	2	699	14	7,924
Spiegel.....	1	0	0	1	575
Youngbush Valley.....	3	0	0	3	2,215
Schuylkill Valley.....	4	1	650	3	1,850
U. Susquehanna Valley.....	5	1	1,450	4	4,186
Maryland.....	1	0	0	1	250
West Virginia.....	1	0	0	1	8,055
Wheeling District.....	8	0	0	8	8,055
Ohio.....					
Mahoning Val.....	15	4	4,809	11	9,445
Central and Northern.....	11	3	2,822	8	5,964
Hocking Val.....	14	0	0	14	3,741
Hanging Rock.....	14	1	104	13	3,068
Indiana.....	2	0	0	2	412
Illinois.....	19	2	4,850	17	22,025
Minnesota.....	1	0	0	1	629
Wisconsin.....	5	0	0	5	4,010
Missouri.....	6	0	0	6	3,512
Colorado.....	3	1	650	2	1,150
The South.....					
Virginia.....	22	9	5,685	13	6,390
Kentucky.....	7	2	675	5	2,568
Alabama.....	38	11	7,855	27	14,490
Tennessee.....	11	2	1,084	12	2,317
Georgia.....	2	1	718	1	600
N. Carolina.....	1	0	0	1	97
Totals.....	261	58	59,076	203	159,026

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
September 1, 1893.....	58	59,076
August 1.....	84	77,907
July 1.....	122	117,072
June 1.....	140	132,079
May 1.....	146	139,788
April 1.....	145	135,488
March 1.....	145	133,579
February 1.....	140	129,396
January 1.....	138	131,731
December 1, 1892.....	136	133,160
November 1.....	133	130,673
October 1.....	128	118,895
September 1.....	128	114,538
August 1.....	131	117,984
July 1.....	140	127,433
June 1.....	145	135,488
May 1.....	147	132,313
April 1.....	152	138,116
March 1.....	163	143,490
February 1.....	167	138,268
January 1.....	163	138,611
December 1, 1891.....	162	142,747

The principal events during August were the stoppage of one Isabella in Pittsburgh, of Claire, Mabel, Sharon and Spearman in the Shenango Valley,

of Everett and all the Cambria furnaces in the Juniata and Conemaugh valleys, of Mingo, Riverside and Stuebenville in the Wheeling district, Cherry Valley, one Cleveland, and Franklin in Northern and Central Ohio, Star in the Hanging Rock region, Glasgow in the Hocking Valley, Tod in the Mahoning Valley, and Citico, Dayton and Rockwood and one South Pittsburgh in Tennessee.

The only furnace which resumed was D of the Maryland Steel Company, at Sparrow's Point.

The status of the anthracite furnaces was as follows:

Anthracite Furnaces, September 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	18	1	589	17	6,094
New Jersey.....	11	1	920	9	3,841
Spiegel.....	3	2	137	1	118
Pennsylvania.....					
Lehigh Valley.....	44	18	7,012	26	9,944
Spiegel.....	1	1	62	0	0
Schuylkill Valley.....	27	12	6,704	15	5,990
U. Susquehanna Valley.....	14	2	788	12	4,200
L. Susquehanna Valley.....	17	2	1,850	15	5,490
Lebanon Valley.....	15	5	3,106	10	4,271
Totals.....	150	45	21,168	105	39,948

For a number of months past our records of active anthracite furnaces show the following:

	Furnaces in blast.	Capacity per week.
September 1, 1893.....	45	21,168
August 1.....	51	23,572
July 1.....	63	29,268
June 1.....	70	33,316
May 1.....	67	33,168
April 1.....	72	34,641
March 1.....	74	34,773
February 1.....	74	32,871
January 1.....	70	32,772
December 1, 1892.....	69	33,602
November 1.....	69	30,869
October 1.....	69	29,958
September 1.....	66	27,453
August 1.....	66	28,821
July 1.....	72	31,754
June 1.....	76	33,209
May 1.....	81	35,473
April 1.....	84	36,487
March 1.....	89	38,678
February 1.....	92	38,124
January 1.....	94	38,307
December 1, 1891.....	85	34,905

We have no record of the resumption of a single anthracite blast furnace during August. The current production, already light, has been lessened even more by several stoppages. There were blown out Chester, of the Wellman Iron & Steel Company, which we group as a Schuylkill Valley furnace, one Bethlehem on the Lehigh, two Lackawanna on the Upper Susquehanna and Vesta and Paxton on the Lower Susquehanna.

Stocks.

The position of stocks, sold and unsold, as reported to us September 1, was as follows, the same furnaces being represented as in former months:

Stocks:	June 1.	July 1.	Aug. 1.	Sept. 1.
Tons.	Tons.	Tons.	Tons.	Tons.
Anthracite pig.....	117,595	114,955	111,468	115,490
Coke pig.....	321,987	324,138	305,390	459,240
Charcoal pig.....	202,608	193,629	191,838	197,881
Totals.....	642,190	632,722	608,696	800,071

While the stocks of anthracite and charcoal pig iron have remained practically stationary, it will be seen that the increase in coke stocks noted last month has continued, nearly 46,000 tons having been added to the accumulation during the month. Nearly one-half of this increase has taken place in the Mahoning Valley, Ohio.

MANUFACTURING.

Iron and Steel.

The Reading Iron Company, Reading, Pa., gave on August 30 a notice to their employees that from September 1 a reduction of 5 per cent. would be made in wages in the rolling mill department, Scott foundry, steam forge and sheet mill. The minimum basis of \$1 for ordinary common labor is not changed.

The Birmingham and Gate City Rolling Mills, at Birmingham, Ala., resumed operations on September 1.

Stockholders of the Indiana Steel Company met last Wednesday at Indianapolis and elected directors, C. W. DeFauw among the number. It is believed that the president will be either J. E. McGettigan, receiver of the Premier Steel Company, or a man of his choice. The Indiana Steel Company will soon resume business manufacturing beams and other structural material.

Tod Furnace, at Youngstown, Ohio, owned and operated by the Youngstown Steel Company, was banked down last week for an indefinite period. The furnace is said to be in good condition and does not need any repairs. The sole cause of the furnace being banked is the dullness in the iron trade.

The Newport Rolling Mill Company, at Newport, Ky., signed the Almagamated Association scale last week, and the plant has been put in partial operation.

The Bellaire Nail Works, Bellaire, Ohio, have arranged a wage scale with their employees, and their Bessemer steel plant was put in operation on August 30, and will continue running as long as sufficient orders are received to warrant operations being continued.

The rod mill department of the Beaver Falls Mills, at Beaver Falls, Pa., which has been idle for a month or more, resumed operations on Monday, the 4th inst.

Part of the plant of the Benwood Iron Works of the Wheeling Steel & Iron Company, at Wheeling, W. Va., resumed operations last week.

In all probability the Oliver Iron & Steel Company of Pittsburgh will start up part of their South Side Mills in that city during the present week. It is understood that the firm will refuse to treat with the Almagamated Association, and will employ only non-union labor in the future.

Additional departments of the Upper and Lower Union Mills, at Pittsburgh, were put in operation last week, giving employment to a large number of additional men.

Five of the 15 sheet mills of the Etna-Standard Iron & Steel Company, Bridgeport, Ohio, are now in operation. The statement that the entire plant of this concern would resume operations on September 1 is without foundation.

The old nail factory of the Brown, Bonnell Iron Company, at Youngstown, Ohio, has been dismantled. This was one of the first nail plants built in the Mahoning Valley, and was erected about 30 years ago.

Mitchell, Tranter & Co., Cincinnati, Ohio, operating rolling mills at Covington, Ky., announce that they have finished extensive repairs to their plant and are again in full operation, ready to fill promptly any orders placed for bars, sheets and angles.

Owing to the financial depression all interested persons have agreed to postpone the sale of the plant of the Brady's Bend Iron Company, at Kittanning, Pa., until September 15.

The Akron Iron Company, Akron, Ohio, have made additions to their 8-inch and 12-inch roll trains. The Lloyd Booth Company, Youngstown, Ohio, furnished the machinery.

At Harrisburg, Pa., on August 30, the receivers of the American Tube & Iron Company of Middletown, Pa., and Youngstown, Ohio, filed a statement showing its condition. The net accounts receivable are placed at \$537,492.57, the merchandise account at \$722,567.52, and the other assets, including the Youngstown, Ohio, establish-

ment, at \$1,225,140.15. The bills payable in agency obligations are \$1,276,541.86, and the accounts payable \$100,315.34. The surplus over liabilities is \$1,108,243.04.

On September 4 the Phoenix Iron Works Company, Meadville, Pa., manufacturers of automatic engines, boilers and heaters, started up the boiler department of their works, the balance of their plant still being idle. They are taking advantage of the shut down to build an addition to their erecting room in connection with the machine shop, and are making some other improvements which give them the needed space and additional facilities for handling work, which is constantly growing, both in quantity and size, demanding more space and better appliances for handling. It is the opinion of this firm that the worst of the financial depression is over, and from now on there will be a gradual improvement, and with this belief in view they have been encouraged to go ahead with their improvements.

The employees of the Cherry Valley Iron Works, Leetonia, Ohio, have agreed to accept the notes of the firm for 75 per cent. of their wages in case it is necessary to issue the same. As yet, however, the firm have not been compelled to avail themselves of the privilege offered them by their men.

Wm. Clark's Son & Co., Solar Steel Works, Pittsburgh, announce to the trade that the fire which occurred on September 2 will hinder their manufacturing operations only temporarily, and only to a limited extent. It will not in the slightest degree interfere with the prompt execution of all orders, as but a single train of rolls is damaged.

Joshua S. Ingalls & Co. of Troy, Ohio, manufacturers of Craig polished sheet steel, have run their mill steadily since the beginning of the year, and have sold more steel up to date than last year. They have not reduced their force by a man; have not reduced hours nor wages.

The Lochiel Rolling Mill, Harrisburg, Pa., in which work was suspended a few months ago as the result of the shut down of the Middletown Tube Works, is being put in shape for resumption on October 1. It is also stated that the latter works will be put in operation at an early date.

The Lalance & Grosjean rolling mills, at Harrisburg, Pa., have resumed operations, and all departments will, it is expected, be in operation by the end of this month.

The Williamsport Iron & Nail Works, Williamsport, Pa., have resumed operations on full time after a two weeks' shut down.

From Ashland, Ky., comes the announcement that the puddling furnaces of the Norton Iron Works have resumed operations after an idleness of four years, and that the entire plant will be put in operation at an early date in the manufacture of iron nails.

The puddlers employed in the rolling mills of Alan Wood & Co., Jawood Lukens and J. Wood & Bros. Company, in Conshohocken, have refused to accept a 19 per cent reduction in their wages and have struck. The puddlers offered to go to work at a 10 per cent. reduction as a compromise, but the three firms rejected their proposition.

Work has been resumed at the Cohoes Rolling Mill, Cohoes, N. Y., and the full force of hands, numbering about 400, have been given employment.

The Maryland Steel Company, at Sparrow's Point, Md., have put a second furnace in blast.

The National Tube Works Company, McKeesport, Pa., resumed operations in another puddling department, comprising 22 furnaces, on the 4th inst., and on the following morning the continuous rolls of the finishing department resumed. Foreman and employees of three furnaces of the butt weld department have been notified to prepare for resuming work, and a few men have been placed at work in the yards of the blast furnace plant of the same company, loading pig iron for shipment. These departments have been closed from four to ten weeks. About 2000 men are now at work in the plant where only 50 were employed three weeks ago.

All the mills of the Pennsylvania Steel Company, at Steelton, Pa., have started up and give employment to 2000 men.

The Thomas Iron Company, Hokendauqua, Pa., have, it is announced, stopped all repairs on No. 10 furnace, at Hellertown.

The Watts Iron & Steel Syndicate have entirely closed their plant at Middlesborough, Ky., and the "Magic City" is undergoing a period of idleness, only about 150 men, all told, being at work in that once booming town.

Machinery.

Commencing with Monday, September 4, the works of the Westinghouse Air Brake Company, at Wilmerding, Pa., will be operated four days of seven hours each per week.

The Cowles Engineering Company of Brooklyn, N. Y., made an assignment on August 31, without preferences, to Vaulx Carter, treasurer of the concern. The company were organized three years ago under the laws of New Jersey, with a capital of \$150,000, for the repairing and altering of vessels. Six months ago iron shipbuilding was added to the business. The failure is said to be mainly due to the loss of a large cash deposit in the recently suspended Commercial Bank of Brooklyn, together with the general financial stringency. The amount of the firm's assets and liabilities is not yet known, but it is believed that they will be able to resume and pay dollar for dollar if creditors will grant the necessary time.

The foundry and machine shop of Daniel Damson, Philadelphia, was damaged by fire to the extent of \$40,000 on the night of August 31. The machine department was entirely gutted and the machinery and a stock of finished work destroyed.

The stockholders of the Grant Locomotive Works, at Chicago, have decided to reopen the works. The plant will be running again in a few weeks if arrangements now in progress are completed.

Nine hundred machinists in the Louisville & Nashville Railroad shops, from Cincinnati to New Orleans, have quit work on account of a reduction in wages of 10 per cent.

The building occupied by the Gray's Ferry Foundry & Boiler Company, at Philadelphia, Pa., has been burned, and the loss to the company will amount to \$150,000.

The Whitin Machine Works, at Whitinsville, Mass., have materially reduced their working force.

The Farrel Foundry & Machine Company of Ansonia, Conn., have announced a cut in wages of 15 per cent. on skilled men and 10 per cent. on helpers.

The Knowles Steam Pump Works, at Springfield, Mass., have started up with 10 per cent. reduction in wages.

A part of the force of the Blake Pump Works, at East Cambridge, Mass., has resumed work at lower wages.

The Diamond Machine Company of Providence, R. I., have awarded a contract for an extension of their works.

Miscellaneous.

The New Bedford Copper Works, New Bedford, Mass., started their plant last week after a temporary shut down.

Immediately upon the assignment of F. W. Lamb & Co., prominent steam and hot-water fitters, at 258 and 260 Michigan street, Chicago, the firm called their creditors together and by practically unanimous consent the creditors gave an extension of 15 months to the firm. On the 30th ult. the assignment proceedings were dismissed and the firm resumed business.

The mill of the New York Belting & Packing Company, located at Passaic, started up again last week on full time, but with half their regular force, whose wages have been reduced 10 per cent.

The Walter A. Wood Harvester Works, at St. Paul, Minn., have started up again with a force of from 1500 to 2000 men.

At the annual meeting of the stockholders of the Akron Tool Company, Akron, Ohio, held last week, Hiram Kendall was elected president, Geo. W. Crouse vice-president, H. H. Houser secretary and Chas. A. Bowen treasurer.

The offices of the Pittsburgh Reduction Company and the Pittsburgh Testing Laboratory, heretofore located at 116 Water street, Pittsburgh, have been removed to the Ferguson Building, in that city.

The Hartman Mfg. Company, manufacturers of Hartman's wire specialties, with works at Ellwood City, Pa., advise us that there is no truth in the report that wages of their employees have been reduced 25 per

cent. While there has been a rearrangement of the amount of work done by each man, and in some cases it has been increased, there has been no general reduction in wages.

Wallace, Banfield & Co., Limited, manufacturers of tin andterne plate, with works at Irontdale, Ohio, advise us that they have been running a part of their plant for the past three weeks, and during last week it was running to full capacity. Unless additional orders are received, however, it will be necessary to close down again in a short time.

The sheriff has taken charge of the place of business of the Richardson & Morgan Company, manufacturers of furnaces, at 92 Beekman street, New York, on an attachment for \$25,367 in favor of Charles T. Ayer, granted on the ground that the corporation is a foreign one. The foundry is at South Norwalk. Talmadge Baker, ex-Senator and ex-Secretary of State of Connecticut, is president, Jeremiah J. Richardson vice-president and Alonzo R. Morgan treasurer. The company, it is said, were financially aided by Fred. Ayer of Lowell, Mass., brother-in law of Mr. Morgan, who had a controlling interest in the stock and has all along been regarded as the principal creditor.

The St. Louis Stamping Company, St. Louis, Mo., have resumed operations after an idleness of several weeks. The Amalgamated scale has been signed and 2000 men have returned to work.

The Murray & Dougal Car Company of Milton, Pa., employing 800 men, have resumed operations with no reduction in pay.

Judge Van Brunt of the Supreme Court appointed J. Maxwell Carrere permanent receiver of the property of the Carrere & Haas Iron Works of Brooklyn, N. Y., and has granted an order dissolving the corporation. The receiver is required to give a bond of \$15,000.

A press dispatch from Toledo, Ohio, under date of September 5, says that five local factories that shut down during the recent financial depression will resume operations to-day. They are: The Ames Bonner Brush Works, 300 men; the Malleable Iron Works, 300 men; the Milburn Wagon Works, 400 men; the Toledo Metal Wheel Company, 130 men, and the Snell Cycle Fittings Company, increase from 80 to 230 men.

Among recently authorized corporations in Illinois are the following: Rulke Pressure Blower Company, Chicago; capital stock, \$1,000,000; incorporators, Peter Hartford, J. L. Hughes and Edgar M. McCauley. The Chicago Fire Engine Company, at Chicago; capital stock, \$10,000; for manufacture of chemical fire extinguishers and fire department supplies; incorporators, C. D. Stone, W. S. Baker and J. M. Ferguson. Dalton Company, at Chicago; capital stock, \$20,000; for the manufacture of heating and plumbing plants; incorporators, John F. Dalton, Peter H. Dalton and Wm. Clamsky. The Choteau Pneumatic Hammer Company, at Chicago; capital stock, \$5000; for the manufacture of tools and machinery and for general contracting; incorporators, Frank A. Lapham, Daniel Egan and J. W. Dunthy. Hercules Ice Machine Company, at Aurora; capital stock, \$500,000; for the manufacture of machinery and apparatus of all kinds; incorporators, Edward Worcester, W. H. Cottrell and Joseph H. De-frees. This company will be formed to take over the business of the Hercules Iron Works, forced into insolvency by the burning of their cold storage plant at the World's Fair.

Trade Publications.

THE NATIONAL MACHINERY COMPANY of Tiffin, Ohio, have published two catalogues describing their bolt and nut machinery and the National rock and ore crusher. These describe very fully and in detail the several types of machines referred to. Under the caption "Screw Threads" we find the following:

The necessity for a general uniform standard is so generally conceded that there is no excuse for any mechanic imposing upon the public with bastard threads, and it is to every manufacturer's interest to adopt this standard. The sharp, worthless angles, which weaken the bolt without serving any good purpose, and allowing any slight contact to bruise and

flatten the threads, causing also the taps and dies to wear out more rapidly, are certainly only worthy of being discarded by sensible mechanics. Bridge builders, railroads and all manufacturers are adopting the United States or Franklin Institute standard, and ultimately all will require to fall into line. Mechanics appear to be most careless about this very important matter. A tap is a tap; if it cuts easily and gives an apparent fit, no questions are asked on the exactness of its fit on the whole bearing surface, or if the angles are correct. Take and use the same tests as in other fits, and blacken either the male or female thread and ascertain what contact you get. Demonstrate this with the different makes of taps, and you will find that it is no sinecure to require to make a good tap with perfect angles, giving a full area of contact. Very few screws cut in the lathe will show a full contact; the difficulty in having a tool a true angle, or held in the exact position, are features which ordinary mechanics do not realize. The slightest spring in the tempering of a tap will, of course, make it faulty. The functions of screw threads are so important in this present "Age of Iron," that we venture to predict mechanics will before long give this subject very careful consideration.

In constructing the National bolt cutter we have given this matter especial attention, as we discovered many theories in the field, and some of these by eminent authorities. Two questions had first to be settled: "How many cutters shall be used?" "What is the proper position of same?" The first of these was easily determined. Very little bar iron is rolled quite round, and in cutting with three dies or cutters, the tendency of the bolt is to recede into the space opposite the cutter, making it more oval and irregular. This is noticed particularly when cutting slowly; cutting below $\frac{3}{4}$ inch it is not so noticeable, especially if the dies are left with considerable bearing face, but this leads to friction, which it is desirable to avoid.

In rapid cutting of carriage and other small bolts, the dies, in addition to clearance, have sometimes less than 1-32 inch lead, and are operated at a speed of 250 to 400 revolutions per minute. The friction requires to be brought down to the minimum, in order to stand this high rate, and four dies or their equivalent (but very much inferior) half dies are always used. We consider no three die head, therefore, mechanically correct to thread a round bolt.

We would hardly have thought it necessary to dwell on this point, but we understand some mechanics have compared a tap with a die, as being similar, forgetting that the tap has all the time an equal external resistance, which is not the case with the bolt.

However, the most difficult problem to solve was, "what position should the cutter be placed in?" We are aware that exception may be taken to our conclusion in this matter, but as we arrived at same only after long and careful consideration, we propose to give it.

The bolt cutter is but the successor and substitute of the lathe in its peculiar functions, therefore the principle of holding a cutting tool in the lathe would naturally follow on it. If you wish to cut a smooth thread in the lathe, you lead the cutter. Now, in addition, there will always be a slight yield or play on a cutter in an opening, movable die head, and if the cutter is placed in a line with the center, you will find in practice you are really below it. Several good authorities and makers place the die in a line with the center, but, unless for very rapid threading, you will secure much better results from following the practice of lathe work. For very rapid cutting, and where the dies are held solid in an arm, we favor the exact center, simply on account of the lessened friction, but the thread will not be as smooth. All opening, movable die heads, therefore, we make to lead the center about half the diameter of the cutter, say from $\frac{1}{8}$ inch in a small head to 5 16 inch in a large one, cutting 6-inch pipe or 4-inch bolts.

Cutting or hobbing the dies, when they are on a center line, is done with taps larger in diameter than the size called for, in order to secure the necessary relief, but when they lead the center, a shade smaller tap is required for the purpose. A 1-inch die we cut with a master tap 1-32 inch smaller, then file off the back of the thread on the die, leaving the small, relieved front segment of the circle. The National head allows of the dies being contracted this 1-32 inch while cutting them, and then adjusted back into position for the bolt afterward.

THE EVANS FRICTION CONE COMPANY of 85 Water street, Boston, in their 1893 catalogue describe the many and varied applications of the frictional gearing made by them. The countershaft for driving machinery requiring different speeds consists of two cones, mounted with their axes parallel, and having between and in frictional contact with them a loose endless belt. One of these cones being arranged as the driver, it is evident that the speed of the driven cone can be varied by changing the position of the belt. In frictional miter gears, a loose square endless belt is employed. It has been demonstrated that frictional gearing employing a 1½-inch belt will transmit more power than a 3-inch belt driving a pulley in the usual way. It is stated that "thirty-four of the most modern paper machines in this country, Canada and Europe are being driven by Evans friction cones."

FROM THE PRATT & WHITNEY COMPANY of Hartford, Conn., we have received a catalogue descriptive of the machine tools built by them, including drop hammers, punching presses, shears, cranes, cylindrical and caliper gauges and end-measure test pieces, cutters for teeth of gear wheels, combination lathe chucks, ratchet drills, taps, dies, reamers, milling cutters, spiral shear punches, automatic grain scales and special machinery. In the preface we find the following description of the works: The Pratt & Whitney Company were organized in July, 1869, with a capital stock of \$350,000, since increased to \$500,000. The premises of the company are on the north bank of Park River, a branch of the Connecticut, about one-third of a mile from the Union Passenger Depot—the tracks of the New York, New Haven & Hartford and the New York & New England railroads passing close to the buildings, to which branch tracks are led for convenience of transporting iron, steel, coal, &c., for the supply of the works, and for removing finished machinery. The largest or main building is of brick, with brownstone trimmings, and is four stories high, 225 feet long and 45 feet wide, the floors having an area of 40,500 square feet. A brick building, 146 x 42 feet, three stories, erected in 1881, for heavy machine work mainly, has about 18,000 square feet of floor area. A four-story and basement brick structure, finished in 1883, has about 44,000 square feet of floor space, for the storage of patterns and tools, and is fitted up with an elevator, overhead tramway, and trolleys for the convenient handling of machinery. A two-story and basement brick building, finished in 1891, has about 39,000 square feet of floor surface, for manufacturing and storage. This building is heated by the blower system. Each building is furnished with a system of automatic sprinklers for extinguishing fires, and the company have powerful pumps for supplying the apparatus and for other purposes, should the ordinary city supply of water fail temporarily from any cause. The forging shop is 175 x 42 feet, having ten fires, a Marchand & Morgan steam hammer of 700 pounds, a Hotchkiss atmospheric hammer of 60 pounds, three drop hammers, two adjustable-stroke tilt hammers, two trimming presses and a patent power shear. The main foundry building, 120 x 60 feet, with an extension 60 x 50 feet, has wings containing a cleaning and pickling room, 48 x 40 feet, a room for core making, with ovens of large capacity. The foundry also has a crane of 15 tons lifting power, a smaller one for lighter work, a small cupola for special iron, two McKenzie cupolas, known as Nos. 2 and 4 of this celebrated make, and a large McKenzie blower. In the machine shops are 400 lathes of various kinds, 115 planers, 85 drilling machines, 120 milling machines, 15 screw machines, 13 gear and rack cutters, 10 boring mills and 200 other machines, in addition to the tools used in the pattern shop. When all these are running the concern can give employment to about 950 men. The four engines that drive this machinery are of 200 horse-power. All the rooms are heated by steam and lighted by gas or electricity.

The Caspin Mining Company of Milwaukee have filed a certified copy of a mortgage for \$1,038,000 on their property, ore and franchises, for the purpose of payment of labor and taxes and for the development and operation of the mine at Iron Mountain, Wis.

TRADE REPORT

The most encouraging development during the past week has been the easing of the money market. The premium on currency has virtually disappeared, and it is a fact that commercial paper does occasionally find a buyer. We have been told of transactions in moderate quantities in first-class paper down to 7 % by private parties, while moneyed institutions are still asking and getting 6 % and a commission, adding the same rate. While this does not mean immediate relief to the industrial and mercantile community, it does prove that the turn has come.

The blast-furnace returns which we publish elsewhere are generally interesting, since they indicate the tremendous strain under which the Iron and Steel trades have been. Practically we have come down in three months from a full normal rate of production of 9,000,000 tons per annum to one half that quantity. When it is considered that a blast-furnace plant is not readily closed down as other works, being continuous in its operation, it is fair to assume that the output of our Steel Works and Rolling Mills has shrunk even more. It is this, probably, which accounts for the increase in the stock of Coke Iron, which has taken place chiefly in those sections where the manufactures of Iron and Steel are extensive.

Consumption is undoubtedly still light, but there are indications that it is recovering somewhat. Chicago records a good contract for agricultural implement material and notes a better outlook for architectural work. Philadelphia, too, expects to secure some work in that line, while in New York the Third Avenue Bridge, calling for about 4,000 tons of material, will give employment to some hungry mill.

It looks as though cheap Soft Steel is to be a feature of the trade for some time to come. Philadelphia quotes \$22.50, delivered, as the lowest on record, while Pittsburgh is known to be hugging close to \$20. The enormous unemployed converter capacity of the Rail mills banishes hope of any development of consumption beyond the possible supply.

In the metal markets the firmness in Copper, Tin and Lead continues, and even Spelter shows a disposition toward greater strength.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, }
CHICAGO, September 6, 1893. }

Pig Iron.—Slight symptoms of a revival of business are apparent. Consumers who have had their Iron held back for quite a long time are now ordering shipments on the contracts. This shows either that old stocks have at last been used up or that more business is doing, and consequently that Iron is now needed which has thus far been held in reserve. The further fact is disclosed that parties who have been trying to buy at very low prices, and were out of the market for some time on that account, are now coming in and paying makers' prices. The volume of business in this way is by no means large as yet, but the prospects are certainly more encouraging. The trade promises to run up to a fair volume during the fall months, and manufacturers are feeling a little more cheerful over the outlook. The dullness which has existed so long will now probably give way to reasonable activity, and if this is only of a moderate character it is nevertheless a decided gain over the stagnation of the last two or three months. Quotations are unchanged, but are still subject to the previous remark that concessions are made for prompt cash or immediate delivery.

Bars.—An implement contract for 5000 tons of either Iron or Steel at buyers' option is the most important transaction of the past week. General trade is perhaps not quite so good as the previous week; quite a number of the mill representatives here report very little doing. Enough orders, however, were secured by the East Chicago Iron & Steel Company to start their mill on Tuesday for a short run. An arrangement was consummated on the 31st ult. by which the property was taken out of the hands of the assignee and the company hope that they will be able to keep the mill in operation, but will only run on orders. An effort is being made by most of the Bar-Iron sellers to shorten their terms, and few are now willing to give the usual four months, but insist on 60 days or 2% off for cash. Prices on mill shipment still range from 1.45¢ to 1.50¢, Chicago, half extras, for Bar Iron, and 1.60¢ @ 1.65¢ for Soft Steel. Jobbers report a little more inquiry, but not much increase in the actual volume of business. They state that consumers are now put to some inconvenience who desire special sizes and lengths. They are often obliged to take approximate sizes or lengths at greater cost than if they could get the material they are accustomed to use. Quotations from stock are mainly 1.65¢ @ 1.85¢ for Bar Iron and 1.70¢ @ 1.80¢ for Soft Steel, but in some cases the Iron prices are shaded below these figures.

Merchant Steel.—A few more season contracts for specialties have been placed during the past week, but business is not quite so active as it has been. Prices show no material change and we continue to quote as before.

Rails and Track Supplies.—The Steel Rail situation is as dull as ever, and the published notice that the Rail mills here will shortly stop has apparently not stimulated those who need small quantities to hurry in their orders. The stoppage therefore seems very likely to take place about the middle of the month. Prices are steady at \$30 @ \$32 for Steel Rails, 1.60¢ @ 1.65¢ for Splice

Bars, 2.55¢ @ 2.60¢ for Track Bolts with Hexagon Nuts and 1.85¢ @ 1.90¢ for Spikes.

Other Manufactured Iron and Steel.

—Inquiries are now out for material for a new 12 or 14 story building at the corner of State and Madison streets. It will require some 600 tons of Z-Bars, Angles, &c., and 1000 tons or more of Beams. Figuring is being done on some other proposed buildings, so that work in this line has not altogether stopped. A good demand still exists for small quantities of Beams and other Structural Material, but the bridge works are only moderately employed. Considerable figuring is in progress on Plate work, and there appears to be plenty of business in sight which would soon be placed if the financial conditions should improve. Store trade is by no means what it should be at this season. The railroads are buying very little. The mills are shipping promptly on all orders, and as deliveries are more satisfactory the dealers have reduced their store prices as occasion warrants. Moderate sales are reported of Black Sheets, and a fair store trade is doing in Galvanized Iron, but mill business is light. Prices of mill shipments, Chicago delivery, may be quoted as follows: Beams, 1.75¢ @ 1.90¢; Tees, 1.95¢ @ 2.05¢; Angles and Universal Plates, 1.75¢ @ 1.80¢; Tank Steel, 1.75¢ @ 1.85¢; Shell Steel, 2.05¢ @ 2.15¢; Flange Steel, 2.20¢ @ 2.30¢; High Grade Fire Box, 2.75¢ @ 5¢; No. 27 Common Black Sheets, 2.80¢ @ 2.83¢; Juniata Galvanized Iron, 70 and 10 and 5 % discount; Sheet Copper, 30 and 35 % off, according to quantity.

Old Rails and Car Wheels.—No transactions are reported in Old Iron Rails and we continue quoting at \$14.50 on the basis of last sales. Some inquiry is noted for Old Steel Rails, which are quoted at \$9 @ \$11, according to length. Car Wheels are dull, with nominal quotations \$14 for small lots.

Scrap.—Inquiries are being received from mills in Ohio which are either running or expect soon to start up. Local business is stagnant. Dealers' selling prices are continued as before.

Metals.—Lake Copper is firmer and carload lots are now quoted at 10.25¢. Casting brands are unchanged at 9.75¢. Spelter is quiet, with nominal quotations 3.60¢.

The Anderson Steel Casting Company, successors to Haugh-Kurtz Steel Company, manufacturers of Open-Hearth Steel Castings, at Anderson, Ind., will hereafter maintain a branch office in Room 506, *Inter-Ocean* Building, Chicago, in charge of Vice-President J. A. Kurtz.

Park, Bro. & Co. have made a new departure in their Chicago branch. They but recently fitted up a very extensive Steel warehouse at 50 and 52 South Canal street, securing greatly enlarged facilities as compared with those formerly available at their old quarters on Lake street. They have now removed their offices from the warehouse to Room 901 in The Rookery Building, where Robert D. Kuhn, manager, will hereafter be found. The change will doubtless be appreciated by a very large part of the firm's customers, who find it much more convenient to transact their business in a place so centrally located as The Rookery.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., September 5, 1893.

There is again but little change to note in the condition of the Iron and Steel trades. There are indications of a more general demand, but at best there is nothing urgent and nothing of any size to make the inquiry noteworthy. The trifling increase in the volume of business is more than offset by the number of sellers, so that prices show no rallying power whatever, but the reverse. But there is a better feeling, nevertheless. Money is easier, collections are a trifle better, confidence is being restored and there is a general disposition to entertain business proposals. These are good features and will eventually develop into some degree of activity; but the most that people are inclined to expect for the present is a better demand. Prices cannot improve under prevailing conditions—there are too many sellers for that; but it is a satisfaction to see mills and factories open their doors, even if it is only for two or three days per week. We can assert, therefore, that business is improving, and, instead of distrust and timidity, there are indications which show that confidence is gradually gaining the ascendancy; but nobody looks for much beyond moderate activity and extremely low prices.

Pig Iron.—The demand has not shown much improvements so far. Many of the leading consumers—foundrymen particularly—have done very little work since midsummer, consequently have had no necessity for replenishing stocks. It is expected that things will start up quite lively in a little while, but for the present there is no denying the fact that pig metal cannot be sold in any but small lots. The scarcity of money has been one leading cause of the inactivity, and as that becomes easier things ought to improve. In some lines labor is one of the chief items of expenditure, and as this must be cash at the end of the week, many good concerns decided to cut off the drain from their bank accounts until such times as they could make collections. Many of the Schuylkill Valley stove foundries have been working two or three days a week, some closed entirely, purely because of financial considerations. In other departments of business there has been a similar shrinkage in consumption, so that even the vast curtailment in production has not fully offset the shrinkage in demand, the natural result being some slight accumulations of stocks and a corresponding easiness in prices. This cannot continue very much longer, however. There is a great deal of business which will not admit of indefinite postponement, and with any general revival in the demand it would not require much to stiffen prices considerably. This is merely a contingency, of course, but it is a by no means improbable one, and, therefore, should not be lost sight of. The stove trade especially ought to pick up; this is usually their busiest season, yet, as previously mentioned, there has been no time for years past when so few goods have been manufactured. The trade may be curtailed somewhat, but it is not all lost, and there may yet be a big demand for Foundry Irons. Meanwhile, however, it must be conceded that the demand is light and prices inclined to

droop, especially for cash or for good short time offers. Nominal quotations are about as follows for Philadelphia and near-by points: Say, about \$12 50 @ \$13, delivered, Gray Forge. \$13 @ \$13 50 for Plain No. 2, \$13 75 @ \$14.25 for No. 2x and \$14.50 @ \$15 for No. 1x.

Steel Billets.—The lowest figures ever recorded have been made here during the past week: viz., \$22.50 delivered. There is not much demand, and while \$22.75 @ \$23 is asked, \$22 50 would not be refused for 1000-ton lots, providing the terms of settlement were made reasonably prompt.

Finished Material.—There is more business doing, and also more disposition to take up matters which have been in abeyance since the stringency in money set in. It cannot be said that there is any very decided movement, but it is encouraging to find that the tendency is to consider extensions of business operations rather than curtailments. This, however, is probably all that the situation warrants us in saying, as prices are at the very lowest, orders sharply competed for, and in the majority of cases mills not employed to more than one-third to one-half of their capacity. Nevertheless there is a disposition to regard the outlook as better than it has been for two or three months past, and while no one expects anything like activity or materially better prices, the tendency from week to week is likely to be gradually toward improvement. Sales recently have been confined almost exclusively to small lots—carloads and from that to 50 or 100 tons each. There is some specifying, too, on old contracts, but at best business is at a very low ebb, and as yet there is nothing in sight likely to add very much to the amount of work now on the books. There is something in structural work, two or three contracts of 300 to 400 tons each, on Market and Filbert streets, besides the 3000 to 4000 tons for the Bourse, which is to be taken up under new bids. The plans originally proposed exceeded the appropriation by some \$200,000; they have now got it within the limits for which they have money in hand, so that it is presumed work will be commenced at once. Apart from work of this class, there is very little new business in prospect except the usual run of small orders, which will, doubtless, be sufficient to maintain the *status quo*, but hardly likely to cause any very decided increase of activity. Prices are irregular, and on good-sized orders rather inclined to droop, nominal quotations being as follows:

Grooved Skelp, delivered.	1.50¢	@	1.55¢
Best Refined Bars.....	1.55¢	@	1.60¢
At interior points.....	1.50¢	@	1.55¢
Tank Steel	1.65¢	@	1.70¢
Heavy Plates.....	1.70¢	@	1.75¢
Shell.....	1.80¢	@	1.90¢
Flange.....	2.00¢	@	2.20¢

Old Material.—There is no change whatever, the demand being slow and prices almost as irregular as ever. Nominal quotations for lots delivered are about as follows:

No. 1 Wrought Scrap, delivered.....	\$13 00	@	\$14 00
Machinery Cast, delivered.....	11.00	@	11.50
Heavy Steel Scrap, delivered.....	14.00	@	15.00
Old Iron Rails, delivered.....	16.50	@	17.00
Old Street Rails, delivered.....	18.00	@	18.50
Wrought Turnings, delivered.....	10.00	@	11.00
Cast Borings, delivered.....	7.00	@	7.50
No 2 Light Scrap, new.....	8.00	@	8.50
No 2 Light Scrap, old.....	6.00	@	7.00

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building,
PITTSBURGH, September 5, 1893.

The situation in the Iron and Steel trades in this district as we find it today shows considerable improvement over that of one month ago. Orders are more plentiful, particularly for some lines of Finished Material, while it is also evident that money is a little easier. Last Saturday was pay day with a number of local concerns, and very little trouble was experienced in getting currency to make up the pay rolls, and in no case, as near as we could learn, was it necessary to pay a premium to get it. It is generally accepted that the worst of the hard times is past, and while recovery will necessarily be slow, it will not be long until there will be a fair amount of business doing.

The Oliver Iron & Steel Company, operating under H. W. Oliver, receiver, started up their South Tenth Street Mills on Monday morning, the 4th inst., with non union men. The 16 inch bar mill was first put in operation, and if orders come in fast enough other departments will be started in a few days. No trouble was experienced in getting enough men, as there were three or four applicants for every position vacant. In addition, the plant of the Hainsworth Steel Company, which is largely controlled by the Oliver Iron & Steel Company, was also put in partial operation. The decision of the Oliver Iron & Steel Company to operate all their mills hereafter with non union men is a serious blow to the Amalgamated Association and has hastened considerably the final disruption of that organization, whose end does not seem to be far off. One other large Pittsburgh concern whose works are now idle have also decided to run non union and will likely start up on Monday of next week. Similar action will probably be taken by a number of concerns in the Mahoning Valley.

Pig Iron.—The market is in extremely unsatisfactory condition, there being very little demand. The mills that are in operation are using material bought some time ago, and as none of them are working up to their full capacity, many of them will not be ready to buy for some time yet. The furnaces of this district that are in operation are: One Carrie, Clinton, six Edgar Thomson, Edith, three Eliza stacks, one Isabella and the two Shoenberger stacks. In the Mahoning Valley the Phoenix, Girard and Haselton are in operation. In the Shenango Valley, Alice was running a few days ago, but is probably banked by this time. It will thus be seen that production has been reduced more than one-half, and yet reports of stocks show that more iron is being made than is being consumed. It is the impression that it will take considerable time before any material improvement, either in demand or price, will be felt. We quote as follows:

Neutral Gray Forge....	\$11.75	@	cash.
All-Ore Mill.....	11.75	@	\$12.00	"
Bessemer Pig.....	12.40	@	12.50	"
No. 1 Foundry.....	13.00	@	13.25	"
No. 2 Foundry.....	12.00	@	12.25	"
Charcoal Foundry No. 1	15.00	@	16.00	"
Charcoal Foundry No. 2	14.00	@	15.00	"

Billets.—In this district Jones & Laughlins, Limited, Hainsworth Steel Company and Shoenberger & Co. are running, though not to full capacity. In the Wheeling district the Bellaire Nail Works have resumed, though not full, while the Riverside Iron Works

will likely start in a short time. There was an increased inquiry for Steel last week and two sales involving about 5000 tons have been closed. A good round block is being figured on, with chances about equal of its going through. Rod Billets continue to rule at about \$20.25, at makers' mill. Under very favorable conditions this price would be shaded.

Steel Rails.—There is nothing doing, the local mill still being closed owing to lack of orders.

Finished Iron and Steel.—There has been a slight increase in tonnage in Beams and Channels. Plates continue quiet, with most of the mills making half time or less. Inquiries for Merchant Steel are more numerous, and season contracts, which are later this year than usual, are coming forward in a very satisfactory way. Sheets are in fair demand, especially Galvanized, in which there is a good trade. Trade in Bars continues somewhat disappointing, the low prices ruling apparently not having the effect of causing buyers to place their orders more liberally. It is stated that a number of the Valley mills will likely start up during September, and will employ non-union labor. We quote Beams and Channels, up to 15 inches, at 1.60¢ @ 1.70¢, f.o.b. cars, Pittsburgh; Angles and Universal Plates, 1.60¢ @ 1.70¢; Tees, 1.65¢ @ 1.75¢; Z-Bars, 1.70¢ @ 1.80¢; Tank, 1.60¢ @ 1.65¢; Shell, 1.70¢ @ 1.80¢; Flange, 1.80¢ @ 1.90¢; Ordinary Five Box, 2.25¢ @ 2.50¢; Special, 3¢ @ 4¢; Machinery Straightened Tire Steel, 1.80¢ @ 1.85¢; Roe Calk, 2.05¢ @ 2.10¢; Hammer Lay Steel, 2.90¢ @ 3¢; Open Hearth Spring, 2¢; Sleigh Shoe, 1.80¢; Bessemer Machinery, 1.80¢; Steel Bars, 1.40¢ at mill, with Bar Iron extras. Bars in the Mahoning Valley are held at 1.40¢, half extras, at mill. No. 24 Soft Steel Sheets, 2.50¢; No. 26, 2.65¢; No. 27, 2.75¢. Galvanized Sheets we quote at 70 and 10¢ in carload lots and 70 and 7½¢ in less quantities.

Muck Bars.—Prices are ruling at \$21 @ \$21.50, delivered at buyers' mill, but there is no demand.

Ferromanganese.—We continue nominal quotation of \$57 for domestic in the absence of sales.

Rods.—The Rod department of the Beaver Falls Mills has again resumed operations. It is expected that the increased activity in the Wire Nail trade will soon be reflected to some extent in Wire Rods. We continue nominal quotation of \$28 at mill.

Barb Wire.—Stocks of Barb Wire in this vicinity have been pretty effectually cleaned up, and as a result some of our largest buyers have been compelled to purchase in other markets. Considering the season of the year, there is a very fair volume of business. We continue to quote Four Point Galvanized in carload lots at \$2.35 @ \$2.40, with the usual advances for smaller lots. Plain Wire is in fair demand and we quote at \$1.65 in carload lots for Nos. 6 to 9, and for less than carload lots \$1.70 @ \$1.75.

Pipes and Tubes.—The increased demand referred to in our issue of last week continues, and there is more activity among the Pipe and Tube mills than for a month past. Additional departments of the National Tube Works Company were put in operation last week. Prices are looking up to some extent, and it is stated some extremely low quotations have been withdrawn.

Wire and Cut Nails.—There promises to be more activity among the Wire-Nail mills within a short time. A very fair demand is reported, and altogether the outlook is more favorable than for some time past. We quote Wire Nails at \$1.40 @ \$1.45 in carload lots at mill.

Coke.—Connellsville Coke makers are taking a more hopeful view of the situation. While there has been no material increase in demand the outlook promises better trade before long. For the week ending August 26 there were 3356 ovens in the Connellsville region in blast, and 13 988 idle, with a total estimated production for the week of 29,715 tons. Compared with the production of the previous week this was an increase of 1815 tons. Since the above date the H. C. Frick Coke Company have blown in 238 more ovens at their various works in the region, and it is probable additional ovens will be fired within the next few days. Prices are unchanged and we continue to quote Furnace Coke at \$1.20 @ \$1.25 in tons of 2000 lb, f.o.b. cars in Connellsville region. Foundry Coke we quote at \$1.50 to dealers and \$1.65 to consumers.

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fifth and Main Sts.,
CINCINNATI, September 6, 1893.

There has been little if any increase in the volume of business in Pig Iron during the past week, but it may be said that the urgency to sell is less pressing, although low prices would doubtless be still accepted for spot cash and prompt shipment. There is rather more inquiry for forward delivery, but at such low prices that the furnaces refuse to entertain the bids, asking an advance of 50¢ per ton over what the Iron could be bought for with ready money. There has been a fair volume of single carload orders in this district, but the larger demand comes from the East, and even the aggregate is not of importance. The only favorable feature to the trade is the moderate improvement in the financial situation. There is a decided increase in collections, and maturing paper is paid with a commendable degree of promptness and with fewer applications for renewals. The production of Pig Iron has been so far reduced that with even a little revival in the demand it is evident that a scarcity of Iron would soon be developed. Consumers are generally letting their stocks of Pig Iron run down to the lowest point possible, and there are few large melters of Iron in this district, but the Iron Pipe works here are running right along, if not full handed, and have orders to keep them busy for many weeks. There is no movement whatever in Charcoal Iron, and quotations are nominal:

Foundry.

Southern Coke, No. 1.....	\$12.75 @ \$13.00
Southern Coke No. 2.....	10.75 @ 11.00
Southern Coke No. 3.....	10.25 @ 10.50
Ohio Soft Stone Coal, No. 1.....	15.50 @ 16.00
Ohio Soft Stone Coal, No. 2.....	14.50 @ 14.75
Lake Superior Coke No. 1.....	15.00 @ 15.25
Lake Superior Coke No. 2.....	14.00 @ 14.25
Hanging Rock Charcoal, No. 1.....	18.50 @ 19.00
Hanging Rock Charcoal, No. 2.....	17.50 @ 18.00
Tennessee Charcoal, No. 1.....	14.00 @ 14.25
Tennessee Charcoal, No. 2.....	13.00 @ 13.25

Forge.

Gray Forge.....	10.00 @ 10.25
Mottled Coke.....	9.75 @ 10.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	17.75 @ 18.00
Lake Superior Car Wheel and Malleable.....	17.00 @ 17.25

St. Louis.

(By Telegraph.)

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, September 6, 1893.

Pig Iron.—The demand does not show any signs of improvement, so far as large purchases are concerned. Consumers continue to buy in carload quantities, and at this writing there is nothing to indicate that any change from this policy is anticipated. Prices are steady and work is being gradually resumed in many of the large manufacturing factories. Locally banks are inclined to be more liberal, and on good collateral manufacturers are obtaining money to carry on business. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$12.25 @ \$13.50
Southern Coke, No. 2 Foundry.....	11.75 @ 12.00
Southern Coke, No. 3 Foundry.....	11.25 @ 11.50
Southern Gray Forge.....	10.50 @ 10.75
Southern Car Wheel.....	17.50 @ 18.00
Lake Superior Car Wheel.....	16.75 @ 17.25
Ohio Softeners.....	16.00 @ 16.50
Missouri Charcoal, No. 1 Foundry.....	13.00 @ 13.50

Bar Iron.—Jobbers report a steady trade and complain that they are unable to obtain prompt shipment from mills, and their stocks are necessarily broken. Car works are nearly all working only a portion of their plant and are not in the market at present. We quote from mill 1.50¢, half extras, f.o.b. cars East St. Louis. Jobbers ask 1.65¢ @ 1.70¢ for lots from store.

Barb Wire.—Trade is a trifle better and most of the low-priced Wire has either been sold or withdrawn from the market. Mills quote 2¢ for carload lots of Painted to jobbers, with 40¢ per cwt. additional for Galvanized. Jobbers ask \$2.10 @ \$2.15 for small lots of Painted.

Wire Nails.—The improvement noted last week continues. The demand is fairly heavy and mills quote \$1.55 in carload lots to jobbers. For the country-trade jobbers quote \$1.65 for small lots.

Rails and Track Supplies.—Steel Rails continue dull and neglected at \$30 @ \$31. Track Supplies are in the same condition and are quoted as follows: Splice Bars, 1.65¢ @ 1.70¢; Spikes, 1.90¢ @ 1.95¢; Bolts, Square Nuts, 2.50¢; with Hexagon Nuts, 2.60¢. Old Iron Rails are weak at \$15 @ \$15.50.

Pig Lead.—The market for Pig Lead is fairly jumping, large blocks selling to-day at 3.75¢ and buyers climbing for more at 3.80¢ @ 3.85¢. Consumers have awakened to the fact that the stocks of Lead are unusually light, and even at to-day's prices sellers do not appear anxious to part with the metal. The shutting down of the mines, coupled with an increased demand, explains the rapid advance, and it would not be surprising to see Lead selling at 4¢ before many days.

Spelter.—Sales of this metal have been limited to carload quantities at 3.40¢. There is an undertone of strength to the market, however, which will make itself felt in higher prices before the month is out. To-day the market is sizzling, but will be boiling before long. An early revival in the Iron trade will go far toward sending the price of the metal upward. The better grades of Spelter command 3.55¢ @ 3.60¢.

New York.

Office of *The Iron Age*, 96-102 Reade street, }
New York, September 6, 1893.

Pig Iron.—The event of the week, devoid of any sensational features, however, has been the announcement of a reduction in price by the Thomas Iron Company of 50¢ per ton on Foundry grades, making their tidewater price \$14.50 for No. 1x, \$13.50 for No. 2x and \$12.75 for No. 2 Plain. In taking this action the company desire to protect their trade. As a matter of fact, they follow the market rather than lead it, and are still above the prices at which Iron satisfactory to many consumers has been sold for quite a long time. We quote Northern brands \$14 @ \$15 for No. 1; \$13 @ \$14.25 for No. 2; \$12.25 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13.25 @ \$14.25 for No. 1; \$12.25 @ \$13.25 for No. 2; \$11.50 @ \$12.25 for No. 3; \$11.75 @ \$12.25 for No. 2 Soft, and \$12.25 @ \$13 for No. 1 Soft. Gray Forge is \$11.25 @ \$12.

Spiegeleisen and Ferromanganese.—Deliveries of Spiegeleisen to rail mills are being delayed. There is no new business.

Billets and Rods.—The market is very dull. We quote nominally: Domestic Billets, \$22.75 @ \$24, and foreign Billets, \$28 @ \$28.50, tidewater; domestic Wire Rods, \$30 @ \$31, and foreign Rods, \$39.50 @ \$40.

Steel Rails.—The canceling of old orders is rather more frequent than the closing of new contracts, and practically to-day every Steel Rail mill in the country is idle. The mills have orders on their books, but cannot or will not ship. Until the railroad companies are in much better shape financially than they now are the mills will be idle, with occasional spells to roll small lots for immediate delivery.

Track Material.—We quote: Spikes, 1.70¢ @ 1.90¢; Fish Plates, 1.45¢ @ 1.60¢; Track Bolts, Square Nuts, 2.25¢ @ 2.40¢, and Hexagon Nuts, 2.40¢ @ 2.50¢, delivered.

Manufactured Iron and Steel.—The contract for the Third avenue bridge has not yet been let. It will call for about 4,000 tons of Iron and Steel. It is understood that the figures are very low. Current business for small lots of Architectural work for minor buildings and for repairs has fallen off considerably and the volume of work of this character is now very small. Plates and Bars are exceedingly dull. We quote: Beams up to 15 inch, 1.75¢ @ 2¢; 20-inch, 2.10¢ @ 2.25¢, for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.70¢ @ 1.90¢; Tees, 2¢ @ 2.15¢; Channels, 1.80¢ @ 2¢, on dock. Steel Plates are 1.65¢ @ 1.90¢ for Tank; 1.90¢ @ 2.10¢ for Shell; 2¢ @ 2.15¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.60¢ @ 1.9¢, on dock, and Common, 1.45¢ @ 1.60¢; Soft Steel Bars are 1.50¢ @ 1.7¢; Scrap Axes are quotable at 1.75¢ @ 2.10¢, delivered; Steel Axes, 1.70¢ @ 2¢, and Links and Pins, 1.70¢ @ 1.80¢; Steel Hoops, 1.75¢ @ 1.90¢, delivered; Cotton Ties, 75¢ @ 85¢ per bundle, at mill.

Old Material.—We quote nominally Old Iron Rails at about \$15 @ \$15.50; Old Steel Rails, \$12.50 @ \$13; No. 1 Wrought Scrap Iron at \$14 @ \$14.50, and Car Wheels at \$11.50 @ \$12.

Metal Market.

Copper.—Nothing new has transpired regarding the export movement in Ingot referred to in last week's report, except that official records show heavy shipments recently, including over 1800 tons of Ingot, chiefly to Continental ports, and 300 tons of Matte. Circumstantial evidence is strong, however, that the business on foreign account latterly has been fully as large, if not heavier, than generally reported, and even more significant is the fact that prices commonly quoted a week ago are now exceptionally low. Thus 9½¢ would appear to be an exceptionally low quotation on Lake Superior Ingot, while 9½¢ for Electrolytic and 9¼¢ for common casting stock stand as sellers' figures against business at fully ½¢ less very recently. Home trade demand has improved in a slight degree only and has little direct bearing upon values, but the combination of export and home trade movement suffices to give the market better tone, not only on private negotiations but on the Metal Exchange, where bearish maneuvering has been quite conspicuous of late. Bids there were raised to 9.65¢ for October and 9.75¢ for November and December deliveries of Lake Superior Ingot.

Pig Tin.—Good support has been given the market by prominent operators, and, while speculation may fairly be said to be on strictly conservative lines, with carrying forward of old deals from current month to October delivery comprising the main deal, prices have averaged somewhat higher. Some of the statisticians figure it out that the consumption in this country during August was quite up to that of the preceding month. They also make it appear that spot stocks have been reduced to 6710 tons, against 9100 tons held on July 1, and in quarters where "bullish" sentiment is most pronounced it is claimed that Europe will be drawn upon for supplies in the near future. They figure it out that only four months' supply remains in first hands in this country and picture a lively experience before the end of the year, with an advance in prices to the parity of cost in London, plus 4¢ per lb duty. During the past few days sales have been made at 19.40¢ @ 19.50¢ for prompt delivery, and 0.20¢ @ 0.30¢ has been paid to carry over September contracts to the following month. At the close the bids on current month delivery were raised to 19.65¢, while sales were recorded of 10 tons at as high as 20.20¢ for November delivery.

Pig Lead.—The market has been very firm, with the higher level of prices that were established last week fully maintained and a fair business effected. Several round lots of common Western were taken at 3.75¢ and about 150 tons at 3.80¢ @ 3.85¢. The latter was the ruling price at the close.

Spelter.—Sales of 15 or 20 carloads recently have served to stiffen the market considerably, and at present there is little if any ordinary Western stock offering at less than 3.70¢ @ 3.75¢. Carload lots have realized 3.62½¢. Choice brands are held at 4¢ upward.

Antimony.—Demand is fair and prices are quite steady. We quote at 9½¢ @ 9½¢ for Hallett's, 10¢ @ 10½¢ for L. X., and 10½¢ @ 10½¢ for Cookson's, in round lots.

Tin Plates.—There has been some increase in sales, but the dealings were chiefly of hand to mouth character, and demand at present is moderate. Prices remain without radical change. Spot quotations are about as follows: Coke Tins—Penlan grade, IC, 14 x 20, \$5.20; J. B. grade, do., \$5.27½; Bessemer full weight, \$5.30; light weights, \$4.85 for 100 lb, \$4.80 @ \$4.82½ for 95 lb, \$4.75 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60; Siemens Steel, IC basis, \$5.65; IX basis, \$6.75. Charcoals—Melyn grade, IC, \$6.35 @ \$6.37½; Crosses, \$8; Allaway grade, IC, \$5.60; Crosses, \$6.75; Grange grade, IC, \$5.70; Crosses, \$6.85. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.35; do., 20 x 28, \$15; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.10 @ \$5.15; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.32½ @ \$5.35; do., 20 x 28, \$10.40; Wasters—S. T. P. grade, 14 x 20, \$4.87½; do., 20 x 28, \$9; Abercarne grade, 14 x 20, \$4.87½; do., 20 x 28, \$8.90.

Financial.

The growing improvement in the financial and business situation recorded last week has not only been fully maintained up to the present, but it appears to have developed into a condition of things which bids fair to carry business back to its former position of confidence and credit within a shorter time than was anticipated. The financial rebound of the past week has been quite remarkable. It has carried with it a decidedly better feeling, marked among other features by the disappearance of the premium on currency, an easier money market, and a marked and general advance in the value of securities. The weekly statement of averages of the Associated Banks on Saturday fulfilled the favorable estimates which had been previously made. It showed the banks to have reduced the deficiency in reserves to \$1,600,000, compared with a deficiency of \$6,750,000 on the previous report. Increases are shown of \$3,929,600 in specie, \$2,123,100 in legal tenders, \$3,530,200 in deposits and \$1,131,400 in circulation; while loans decreased \$3,438,100. This favorable showing may be attributed to the return of confidence, aided by the issue of some \$15,000,000 more national bank notes during August, and further arrivals of gold from abroad. The better feeling which has developed is illustrated in the fact that the urgent demand for funds from out of town banks has ceased and the tide is now flowing in the opposite direction, the country banks having been remitting cash to New York in considerable volume during the past few days in liquidation of previous loans. There are also signs that hoarded money is at last being slowly restored to circulation.

No further Clearing House loan certificates have been issued, the amount outstanding in New York remaining the same as noted last week—namely, \$38,280,000. A large proportion of these will, it is believed, be canceled when the repeal of the Silver Purchase law becomes an accomplished fact. But until that event it is unlikely that anything will be done by the banks in the matter. Meantime business men are becoming somewhat impatient at the dilatory action of the Senate.

While the financial situation shows a hopeful front, almost all branches of

trade and industry, while continuing to follow a conservative policy, show distinctly healthier signs. The demand for goods in several lines of business has increased, and trade reports are generally more favorable than was the case a week ago. Numerous banks and industrial establishments have been reported during the past week as resuming or about to resume operations, and the enforced idleness among workers is being gradually reduced. It is pretty generally acknowledged, nevertheless, that the large majority of industries will require considerable time to regain their normal condition of prosperity after the serious disturbance of trade that has taken place. Many, too, will, no doubt, be held in check by the prospects of tariff revision which are now looming up. The shutting down of the Illinois Steel Company's works, announced on Saturday, and the Thomas Iron Company's reduction on all classes of pig iron are incidents of a significant nature, showing that there is as yet no universal "boom." Railway news from the West shows that there has been a material change for the better in that interest; and last week's list of failures, as reported in *Bradstreet's*, shows a marked decrease from the figures of the former week.

The United States Treasury, on September 1, resumed the payment over its counters of paper money, of which it now holds sufficient to meet all probable requirements. The gold balance, which has been reduced to \$97,000,000, will now be built up until the reserve of \$100,000,000 becomes again intact. The fear that lack of money would prevent a free movement of the crops in the next two or three months has now subsided, as money has grown more plentiful in the business centers, and it is known that New York banks are ready to furnish abundance of cash when needed. Another encouraging feature of the situation, pointing to a return of confidence, is that less than 10% of the depositors who gave 30 days' notice to the New York and Brooklyn savings banks a month ago are drawing out their money. In fact, there appears now more prospect of a glut of money than of any further scarcity.

The only serious failure of the week under review was that of the Equitable Mortgage Company, which is said to have caused some apprehension to bankers and others acquainted with the methods of other institutions working on similar lines to the collapsed corporation.

The gold received from abroad during the past few days is thought to be about the last of the large consignments ordered for shipment to this country, the removal of a premium on it making the business without profit. Later on, however, as breadstuffs and cotton go out, it is likely that the movement will be resumed. Meanwhile the imports of gold since January 1, 1893, have reached over \$54,000,000, reducing the balance against exports to some \$14,000,000.

The loan market has developed ease in sympathy with the general financial betterment. Call loans on stock collateral, after ranging between 2% and 5%, averaging 3%, closed on Wednesday at about 3% @ 4%. Time money is again being offered by banks and trust companies at 6% for any period up to one year, but only on first-class, "gilt-edged" securities. The greater part of the time loans are, however, said not to be going into the open market, but to regular customers and largely for banks in the West and South for

crop-moving purposes. On ordinary securities a good-sized commission is still exacted in addition to the 6% interest rate. Funds are reported as having been offered on Government bonds for four and six months at 6% without commission, but this is believed to be an exception, although pointing to an increasing supply of time money in the near future. Commercial paper rates have not as yet been marked down to any extent, but indications point to a revival of demand for this accommodation from the interior. Rates are nominal for single-name paper at about 12% @ 15%. Sales are reported of the best double-named at 10%; while occasional buying is said to be done at 12% for fair double-name paper.

The market for sterling rules firm and quiet, actual business being done at the following rates: 4 82½ @ 4 83 for 60 days, 4 86½ @ 4 86½ for demand, 4 87½ @ 4 87½ for cables, and 4 81½ for commercial. Domestic exchange on New York is quoted as follows: New Orleans, commercial 6.50 premium, bank 5.00 premium; Charleston, buying ½ discount, selling par; San Francisco, sight 20, telegraph 30 premium; Savannah, buying ½ discount, selling par @ ½ premium; Chicago, par; St. Louis, 50¢ premium; Boston, 10¢ discount.

Wall street strongly reflects the improved financial situation. Returning confidence has been marked in the strength and buoyancy of the stock market during the present week. After Monday's holiday it was expected that no startling changes would occur in prices of stocks, which had closed on Saturday generally higher than at any time during the late depression. But on Tuesday there was an unusually active market, the volume of dealings running up to double the usual average, and stocks going up with a rush. Almost all stocks secured material gains, but the advance was more specially marked in some of the leading "industrials," which have lately absorbed most of the speculative interest, notably Sugar, General Electric and Chicago Gas, in which the dealings were very large. The following list shows the extreme fluctuations of the more active stocks since Thursday, August 31, with the closing prices on September 6:

	High- est.	Low- est.	Closing, Sept. 6.
American Sugar Ref.	90½	81½	88½
Atchison, Topeka & S. Fe	22½	17½	21
Balt. & Ohio	70	67½	70
Chicago Gas	63½	52½	63½
Chic. & N. W.	100½	97½	99½
C. B. & Q.	87	78½	85½
Chicago, Milwaukee & St. Paul	62½	56½	59½
Chic., Rock Isd. & Paci- fic	66½	60½	65½
Del., Lack. & W.	139½	135½	139
Genl. Electric	47½	36	47½
Lake Shore	120½	117½	122
Louisville and Nashville	58½	53½	55½
Manhattan	121½	116½	121½
Missouri Pacific	28½	22½	26½
Minnesota Iron, asked			60
Nat. Lead, common	32½	28	31
N. Y. Central	104½	100½	103
N. Y., L. E. & Western	15½	14½	14½
Northern Pacific, pref.	21½	22½	23½
Northern Pacific, com- mon	7½	5½	7
Philadelphia & Reading	20½	16½	19½
Richmond & West Pt. Term.	2½	2	2½
St. Paul & Omaha	35½	30½	35
Union Pacific	24½	21½	23½
Western Union	83½	78½	82½

Government bonds are steady. The last sales noted at the board were \$1-950 4's registered, at 110½, and \$1000 coupon 4's at 112. Railroad bonds are more active than they have been for some time past, and the business has been well distributed. The tone is strong, with sharp advances in most

issues. A large amount of foreign buying is noted in the market. The estimate in which American railway bonds are held in England was expressed in a recent issue of the *London Spectator*: "The fact is that most American railway bonds are sound securities, and hardly any other of equal merit can be obtained which will yield, say, on an average, about 4½%. The majority of them are protected by a big margin of safety, even in those cases where dividends are not paid on the ordinary shares, for often bonds are strengthened rather than weakened by net revenue being withheld from the shareholders and employed in 'betterments.'"

Bar silver is quoted in London at 33½ pence 9 ounce, and in New York at 74¢ 9 ounce. Recent purchases by the Treasury Department were at 73½¢. From a statement made by Secretary Carlisle it appears that the Treasury silver purchases during the month of August were 3,898,922 fine ounces, costing \$2,880,532. The total silver purchased under the act of July 14, 1890, up to August 31, 1893, has been 163,047,664 fine ounces, costing \$151,804,170.

The silver bullion on hand at the several mints is as follows: Philadelphia—114,866 611 fine ounces; cost, \$104,310,793. San Francisco—11,359,142; cost, \$10,291,725. New Orleans—8,303,065; cost, \$7,213,020. Carson—596,674; cost, \$487,218. Total, 134,625,492; cost, \$122,302,756. From the silver bullion purchased 36,087,185 silver dollars have been coined, the bullion therein contained costing \$29,502,117. This number of silver dollars is held in the Treasury for the redemption of Treasury notes, less some \$714,000, which have been redeemed and canceled. The recoining value in silver dollars of the bullion on hand is \$174,061,242. Out of \$5,120,000 worth of coinage executed at the mints of the United States in August \$4,340,800 was gold, as follows: Double eagles, \$2,500,000; eagles, \$1,267,400; half-eagles, \$573,400. The silver coined amounted to 1,910,000 pieces of the value of \$674,000 in half and quarter dollars and dimes. No standard silver dollars were coined.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, September 6, 1893.

Block Tin is higher in the face of heavier supplies. Very indifferent outside home speculative interest and merely fair purchases by consumers. The offsetting feature is quite large purchases recently for Continental account. The advance in prices is about £2. 5/. Latest dealings in Straits were at £79. 10/ for prompts and £79 15/ for three months' futures.

Copper has ruled somewhat higher. Improved outlook in the United States has caused a better feeling here and prompted freer buying, particularly of futures, under which prices improved considerably. Free selling by some dealers brought about a temporary reaction, but, after slight fluctuation, prices recovered on strong American advices, steadiness of home demand and favorable statistical exhibit. The

buying has been heaviest in Merchant Bars for forward delivery. Stocks in Europe decreased 1872 tons last month and the visible supply has fallen off 2185 tons. Chili charters were 2000 tons. Sales of furnace material recently include 650 tons Argentiferous Anaconda Matte at 8/6; 800 tons ordinary Montana Matte at 8/3. No Montana Matte now offering. To-day's quotations on Merchant Bars are £42. 15/ for prompts, and £43. 2/6 for three months' futures. Best Selected English, £46. 10/.

The Tin-Plate market has remained slow. American inquiries have been fair, but there is hardly any demand from 'Frisco or Canada. The closing down of many works fails as yet to stimulate prices. Liverpool quotations are as follows :

IC Charcoal, Alloway grade.....	12/9 @ 13/3
IC Bessemer Steel, Coke finish.....	11/6 @ 11/9
IC Siemens	11/9 @ 12/
IC Coke, B V. grade, 14 x 20.....	@ 11/6
Charcoal Terne, Dean grade.....	@ 11/6

Pig Lead has undergone little change, the price remaining at £9. 15/ for Soft Spanish in the face of light demand.

Spelter is held more firmly at £17. 2/6 for ordinary Silesian, but the market remains extremely slow.

The Iron and Steel trades remain spiritless. Last sales of warrants were at 42/6 for Scotch, 35/1½ @ 35/3 for Cleveland, and 45/6 for Hematite.

The French Engineers.

A party of 47 members of the Société des Ingénieurs Civils arrived in the "Champagne" on Sunday morning and were received by a deputation of American engineers, S. M. Baldwin acting as chairman of the Reception Committee, while A. Fteley, chief engineer of the Croton Aqueduct, acted as spokesman. He delivered a very neat and graceful address of welcome in the French language, to which M. Rey, vice-president of the French society responded, in the absence of M. Jousselin, who was to be one of the guests, but could not come to America on account of sickness in his family. The French engineers were entertained in this city by those members of the four National engineering societies who had been their guests during the visit of American engineers to the Paris Exhibition in 1889. Festivities began on Monday with a breakfast at the Engineers' Club, the day being under the management of Charles Warren Hunt. Entering carriages the party drove through Central Park to the gate house of the Croton Aqueduct, where A. Fteley explained the work. Proceeding to the Washington bridge, the engineers met R. H. Hutton, the venerable engineer who built that beautiful structure. Then they went to McComb's Dam bridge, now being built under the supervision of A. P. Boller, who was present. At 125th street the party re-entered the carriages, and driving the whole length of Riverside drive proceeded to the twenty-sixth station of the Edison Electric Illuminating Company.

Tuesday's principal function was an elaborate lunch in the banquet hall of the Equitable Building, at which T. C. Clarke, the well-known bridge engineer presided. A number of speeches

were made, the effect of the occasion being a charming speech in French by Colonel Pront, editor of the *Railroad Gazette*. During the day the party visited the power house at Ho ston street of the Broadway Cable Road, the Equitable Building and the Brooklyn Bridge, the latter under the guidance of T. C. Martin, the engineer.

Wednesday was devoted to a river excursion on the "Laura M. Sarin," arranged by W. H. Wiley, who acted as chairman for the day.

On Thursday the French engineers will be given a day for their own recreation and business pursuits. On Friday they go to Niagara on a special train, and on Saturday are the guests of the Cataract Construction Company at Niagara. Thence they proceed to Chicago by special train.

The party will remain at the World's Fair for about 12 days and will then return via Pittsburgh, Washington and Philadelphia.

The Lake Superior Ore Consolidation.

The Lake Superior Consolidated Mines have become a corporation. That such an enterprise was under way has been well known among iron men for more than a month, but the end was not reached till to-day. The following statement has been made by W. Merritt of Duluth: John D. Rockefeller, the Wetmores and the Merritts are in it, but the report that Colgate Hoyt or William C. Whitney controls shares is not true. The trust is organized by taking over a majority interest in the stocks from 11 to 14 Mesabaramine mines, on a valuation basis of \$17,000,000, the Duluth, Mesaba and Northern road and its ore docks at Duluth at \$2,000,000 and the Rockefeller interests on the Colby group of Gogebic range mines in Michigan and Wisconsin, and the same interests in the Spanish-American group of mines on the east coast of Cuba. Other properties will go in and the company will control the American steel barge fleet of 25 whaleback steamships and barges for the ore trade and ore receiving docks at Conneaut, Ohio, and railroad facilities for getting ore from there to Eastern furnaces. The company have made an agreement to maintain a standard of prices. These prices will be such as will preclude the possibility of competition by the deep, hard-ore mines of the older range.

This consolidation will mean such a saving in shipping, both by rail and by water, in insurance and in office and other sundry expenses that it will insure us a profit. We prefer to keep the price for the ton at \$4 50, thus enabling the private concerns to make a small margin.

The rod mill of the Consolidated Steel & Wire Company, at Allentown, Pa., has resumed operations.

There is a likelihood that a high-speed electric railroad will be built between Brussels and Antwerp. The conditions there, observes the *Electrical World*, are exceptionally favorable; two large cities close together, with a great traffic, requiring 16 express trains daily each way on the present steam roads. The route is direct and practically level. It is proposed to run a single electric car, holding 60 people, every ten minutes, and making the trip in 20 minutes at a speed of about 66 miles per hour. This speed, it is claimed, could

be safely doubled later on, but it is wisely contemplated to begin with a more moderate speed and to increase it later. The cost of the road is estimated at about \$2,200,000.

Built-in Furniture

A suggestion in regard to house building is offered by the *Decorator and Furnisher*, which has many points in its favor; in fact, in many respects is being now adopted in modern buildings. It is that "of having a great deal of the movable furniture used in modern interiors as a part of the construction of the house itself," and remarks that "civilization is at present being weighted down with a vast quantity of household furnishings which are moved about from one house to another, with an unnecessary expenditure of energy, worry of mind and expense. A great part of the furniture of the house which is usually looked upon as movable is not so of necessity."

The importance of built-in furniture is very largely appreciated by architects and owners. There is more and more a tendency to furnish the house with convenient interior fittings in keeping with the general finish. Wardrobes, hat stands, refrigerators, sideboards and various other hitherto movable pieces are now being built in to correspond with the other wood finish. This feature can, however, be carried further, says *Architecture and Building*, and thus reduce very materially the amount of movable furniture. Such a course generally adopted would doubtless interfere materially with the May Day emoluments of the truckmen, but would certainly conduce to the peace of mind of the householder on occasions of removal.

A simple mechanical contrivance is being adopted by English builders by which window sash may be given two movements, the one upward or downward, and the other inward. Practically, only one action is required to effect the change from an ordinary sash to a casement window. By dropping a catch at one side of the sash the cord is secured, the window frame being released from the sash and slipping into pivot hinges, when it can be opened as a casement and keys itself in so doing; when closing, the sash again engages with the cord, which runs in a groove in the pulley slide and serves as one of the guides to keep it in its place when working up and down as a sash. In this arrangement the beading which is generally used to guide and separate the sash, is entirely dispensed with, the sash being guided by suitable tongues working in grooves on the right or hinge side. On the left side the sash, when closed for use as a lifting window, engages with a metal block attached to the end of the weight cord, which serves to guide it on the frame, the sash being also so arranged that it cannot possibly come off the hinges except when closed.

The daily newspapers report that McKee, Fuller & Co. have secured an order for 5000 cars for Cuba. The facts are that an iron mining company in that island have ordered 20 broad-gauge and 20 narrow-gauge cars, and have bought two locomotives from the Baldwin Locomotive Works, Philadelphia.

The Godcharles and City Mills, cut-nail manufacturers, at Milton, Pa., have started.

HARDWARE.

Condition of Trade.

REPORTS of improved feeling are being received from different parts of the country, and there is no doubt that with the improvement in the financial condition there is a more hopeful tone in business circles. This is certainly true of the Hardware market, and this feeling is reflected in the reports which are given below from representative houses in the principal centers. The stagnation which characterized the market a few weeks ago is being succeeded by a slight movement, as there is a very perceptible increase in the volume of business. Some of the large jobbing houses who during the past month placed exceedingly few orders, and those only to meet their immediate necessities, are beginning to replenish their stock and purchasing such goods as are needed to complete their assortment and put them in a position to meet the demand which is expected during the next few weeks. They are, however, purchasing very conservatively, with an entire absence of the speculative spirit, preferring to take their chances of higher prices or difficulty in obtaining goods rather than purchase beyond their sure requirements. Traveling representatives of manufacturers and jobbing houses are sending in more frequent and somewhat larger orders, but the trade in general throughout the country are pursuing the conservative course of the wholesale houses referred to above. Manufacturers whose works have been closed are beginning to resume operations, and some who have been working on short time are increasing or preparing to increase their output. Some factories are, however, still closed, having stocks on hand sufficient to meet the present demand and being indisposed to accumulate goods. A feature of the business situation which is exceptionally satisfactory is the extent to which prices have been maintained, as manufacturers generally have refrained from cutting prices with a view to inducing sales. There have, of course, been some exceptions and in special cases some lower prices have been made, but, as a rule, quotations are well maintained and manu-

facturers are refusing to sell goods at unremunerative prices. There is still much difficulty in making collections, but there is less reason for complaint in this regard than during the past month or two, and the trade are thus receiving the benefit which results from the improved financial condition of the country.

Chicago.

(By Telegraph.)

The volume of business in Shelf Hardware is now denominated fair, having made steady progress toward improvement since the depth of depression was reached early in August. Seasonable goods are most in demand, such as Coal Hods, Stove Boards, Lanterns, Scoop Shovels, &c., but it is found that when merchants make up such orders they usually look over their stock and include small lots of other goods needed for sorting up. Prospects are getting better and travelers, through the Northwest particularly, are more hopeful for a good fall trade than they have been. Heavy Hardware jobbers report their branch of business as running considerably lighter than usual at this season. Carriage and wagon builders are very quiet and the demand from this direction is only for material needed for repairs. Manufacturers' agents are having a fair trade only, but are receiving better orders from jobbers than from retailers. The latter are buying only from hand to mouth and this will throw a great deal of their trade in the coming months to jobbers. Some of the jobbers are anticipating this condition of business and are now laying in better stocks, so as to be able to meet the demand. The long drought has caused a much larger trade than usual in Tire Bolts, so that manufacturers in that branch have had less reason to complain than their colleagues in other lines.

St. Louis.

(By Telegraph.)

The demand for Hardware continues to show steady improvement. There is no large business doing, and jobbers have about reached the conclusion that no large business can be expected this fall. A steady trade is anticipated, and will doubtless result. Traveling men send in encouraging reports, and in many cases supplement these reports with substantial orders. Collections are growing better daily, and while credits are still closely watched, there is a disposition to be more liberal. Stocks in dealers' hands are light, and with every increase in trade will need instant replenishing.

Portland, Ore.

CORBETT, FAILING & ROBERTSON.—Business during August has been very light. Collections have been at a standstill. The weather has been favorable for harvesting, and the wheat crop everywhere is turning out well. The price for wheat, however, is discouraging to the raisers, and where there is an opportunity they will carry same for a higher price.

The only product to bring a satisfactory price this fall is the hop crop, and as the acreage is constantly increasing, the crop now represents a large amount of money.

The trade generally do not expect much improvement in business for some time to come. Immigration being light, and our industries, like lumber, fishing and mining, at a low ebb, the future is not as promising as one might wish.

Prices show no change, they having ruled very steady for the past three or four months.

Louisville.

W. B. BELKNAP & Co.—There is some improvement in business, manifested more in the way of increasing confidence—that is, less timidity as to credits—but the volume of business is nothing to brag on yet awhile. Purchases are being made for the bare necessities of business life. Telegrams and rush orders are in unusual proportion, showing that stocks (as we know them to be) are extremely light and goods are only bought for actual orders.

Banks are becoming a little less rigid as to outside checks and Eastern exchange, and with the resumption of three banks which suspended, this community finds itself materially better off.

A good many mills are talking of resuming operations, but do not speak over-confidently, as their order books are evidently not well filled. If the mills went on generally, on any product, Bar Iron, Wire Nails or any other one thing, we should soon have an excess and demoralized prices. Fortunately they seem to be governed by prudence and are evidently not disposed to overdo the thing to get business at bankrupt values.

Just at present the situation in the South is somewhat damaged by reason of the fears of epidemic in some towns and by the disaster incident to the great storm on the coast.

Locally the agitation of the strike on the L. & N. R. R. is a topic of much interest, as it is our main reliance for reaching a large portion of the Southern territory. It certainly is not a good year for strikes, but what would the "Exalted Grand Masters" do, or the newspaper head liners either, for that matter, without an agitation of just this kind once in awhile?

If a little less notoriety were given to individuals who figure in the railroad world, from the president down and up again to the grand masters, we believe

that such differences would be amicably and quickly settled nine times out of ten.

The bank clearings in our city compared with last year are only a little over one-third for the month of August. We are practically on a cash basis, and that means a much contracted one.

New Orleans.

A. BALDWIN & Co.—Business in all lines is exceptionally quiet and traveling men are nearly all home preparing for their trips later in the fall. The condition of the money market is having a serious effect in all lines, particularly in building. Large orders for goods in this line are scarce and far between. Jobbers do not seem anxious to push trade and are simply devoting their attention to the wants of their regular customers. There is a more buoyant feeling in the anticipation of the effect that will be felt in business, brought on by the movement of the cotton crop and the consequent increase of the supply of currency.

Cleveland.

THE W. BINGHAM COMPANY.—We are pleased to be able to report a very noticeable improvement in trade since our last. It is, of course, much behind the usual August business, but the great falling off was in the first two weeks of the month, the last weeks reaching nearer the average trade. The orders show plainly the general low condition of stocks in the hands of retailers, for while the quantities are not large the assortment covers over the general line of goods, so that the whole order averages fairly well. Season goods are moving quite freely. Prices on Nails are firm, with only moderate demand. Wire is in fair demand, but prices show no indication of an advance at present. Collections are as good as could be expected under existing circumstances.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—There has been very little change in the situation in the last fortnight. The quite noticeable improvement in the general financial situation is, of course, affecting us here, but it is more in the way of expectation of improvement in the future than in present actual results. Jobbers are making a little more effort for trade, but are not moving with usual activity. Some of the salesmen have been withdrawn from their territory, wholly or in part, and the disposition is manifest on all hands of going slow for the present and waiting for further developments. The trade for the last half of the year is certain to be less in the aggregate than for the same period of last year, but as sales during the first half of the year were pretty large the entire business of the year will not show nearly so large a shrinkage as has been apparent since July 1.

Prices have shown but little change, and this will probably continue, at least until fresh supplies of goods are ordered and the effect on prices of the present stagnation may be known.

Collections have fallen off materially in the last 30 days, and this condition will continue until the crops have begun to move. This movement is just beginning to show itself, but during this month it will probably be slow, as

prices are very low and the farmers are reluctant to part with their wheat, and, besides, the scarcity of funds to move the crops is as yet felt to a considerable extent, though the probability now is that sufficient funds will be available to start the crop toward market as fast as the farmers will part with it at the present prices, and if the financial situation continues to improve there will doubtless be ample funds for the purpose.

The weather during August has been excepti nally favorable, and the crop has never been harvested in better condition, and a large part of it has already been stacked and some of it threshed, though, of course, a very large part of it is still in the shock. With as favorable weather during this month the crop will be certain to come to market in unusually fine condition.

Baltimore.

CARLIN & FULTON.—The demand for goods is now increasing, resulting probably not so much from any relief afforded by Congress as from the sheer necessity of the trade to partly replenish depleted stocks and to anticipate the pressing needs of the fall season just begun.

The month of August is ordinarily one of the heaviest in the year for sales, but it is to be hoped that the month just passed may be no criterion by which to judge of the future, and that the trade which did not get to the market may yet place their orders after the financial question shall have been settled. But it is our experience that the disappointments of one month are seldom compensated for in the next, and that where a customer has been able to pass a season without his customary purchase his next bill is not often twice its usual size.

After all the discussion which had been current in every newspaper, periodical and review in the land, the expression by every board of trade and exchange in the United States and the spectacle of the absolute paralysis of business, it seemed hardly possible that there could be any deferred legislation upon the question of finance, and yet in the Senate of the United States argument drags wearily along and the belief that delays are dangerous seems never to have been the creed of our legislators, who seem rather to prefer to "never do to-day what can be put off till to-morrow."

There are, however, some encouraging features in the situation. Failures have diminished in number—in fact, among the mercantile class they have not been numerous. The trade has for a long while been conservative in both buying and selling, and we can perhaps complain less of collections than of lack of business, and, no doubt, had purchases been heavier, payments would have been worse. The South has harvested large crops of cereals which are needed for home consumption, while the cotton crop will, no doubt, bring prices considerably better than those which ruled last year. We regret to have read recently the action of one of the Alliance organizations in South Carolina, asking the Governor of that State to call a meeting, in order to pass a law to stay the collection of debts maturing by a specified time, which action would undoubtedly be a great disadvantage to those urging it, and we hope that matters will be found much brighter than they believe them to be, and that the early marketing of the growing crop will put the planter in possession of enough to provide for

his necessities and save him from the ill effects of any radical legislation.

Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—The condition of the jobbing trade of Omaha cannot be said to have changed much either for the better or worse since our last report. Jobbers generally appear to be content to let things drift along until there is some show of a permanent improvement in the finances of the country before attempting to push business very hard. The decrease in the volume of business here in Omaha has been no heavier than over the country at large. On the contrary, there are reasons for believing that the depression in business has been felt less here than at many other large trade centers. Trade is quiet, but there has been fortunately no local financial flurry to add to the general depression in business circles. Under the existing circumstances jobbers do not feel like encouraging the retail trade to buy liberally, but on the contrary their efforts are bent to restricting the size of orders in many cases to the most pressing requirements only. A very potent influence on our trade is the corn crop outlook, which is very encouraging in Nebraska at the present time, and as the season is so far advanced there is very little danger of any disaster between now and harvest. With restoration of confidence throughout the country, business would quickly resume its normal condition and the wheels of commerce would once more revolve as rapidly as ever.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—We are able to report some outward indications in the improvement of business, although the general volume of trade is not largely increased since our last letter. An improved feeling, however, unquestionably exists in the general condensed outlook.

Trade has thus far been less than anticipated during the month of August. Persistent efforts of salesmen were not able to secure anything but moderate sized orders for immediate wants, although buyers have, "Micawber like" been waiting for something to turn up.

Caution, dread and fear are the natural results of a malignant epidemic and the disease requires cautious treatment.

Collections during the month of August dragged slowly along, not up to the requirements of the receiver, who naturally has accounts payable staring him in the face.

There is, however, a visible break in the cloud of uncertainty. The preponderant voice of public sentiment, expressed through the various trade organizations throughout the country, coupled with the results of uncertainty, which are being multiplied day after day, as shown by the closing of factories, suspension of banks, failure of industries, hoarding of capital and the daily increasing numbers of unemployed, doubtless quickened the House of Representatives in responding favorably to the country's demands, but the struggle between self-interest and patriotic duty was a severe one, which may soon be more prominently noticeable in the Senate.

It has been quite apparent throughout the recent silver discussions that a

large majority of persons are not inclined to enter into details or figures. Notwithstanding the fact that the silver problem has been before the country for some months and flippantly discussed, a prominent bank official (with opportunities of knowing) stated it was quite evident that not one person in a thousand understood how to arrive at the solution of the various ratios proposed.

One of the exponents of a change of ratio has recently made a calculation, which is, to say the least, misleading. To arrive at this calculation he divides weights direct with values, and suggests that "20 to 1, a tentative proposition, be fixed until actual experience shall show that ratio will not restore commercial value." It will be seen that this proposition is out of all reason. The "mythical pots and pans" would just as likely be brought to our mints as under free coinage.

The facts of the case are these: In a standard silver dollar of 412½ grains there are 371.55 grains of pure silver (the difference being in alloy), and there are 23.55 grains of pure gold in a gold dollar. The proportion, for convenience, is given at 16 to 1, but by dividing 371.55 by 23.55 you will observe it is in reality 15.989+.

To determine the ratio of silver and gold when silver is declining or the ratio increasing multiply the value of an ounce, or 480 grains, of pure silver at 16 to 1—i.e., 129.55—by 16, and divide by the market price of silver. The result will be the ratio.

The silverites in the House of Representatives were willing to concede to the popular desire of some of their other co-workers at a ratio of 20 to 1. At that ratio, to give an honest dollar, the value of silver would be about 1.03. At that date, however, pure silver was sold at about 70 cents. Therefore multiply 129.55 by 16 and divide by 70, and you will arrive at a ratio of 29.55 to 1 as being the proper ratio of silver at 70 cents instead of 20 to 1.

At the present writing silver is held at about 75 cents. By the same rule, divide 129.55 by 16 and divide by 75, and you will find the proper ratio, with pure silver at 75 cents, is 27.55 to 1, taking 16 as the standard instead of 15.989+, while by that exact figure the ratio would be 27.55 to 1.

It is quite evident from recent developments that this country cannot sustain the price of silver alone. The effort was made in substituting the existing Sherman law in place of the compulsory coinage of silver. Had this compulsory coinage not been stopped, but had it been continued during the last three years, the present financial dilemma would doubtless have been far more serious.

The entire country, as a rule, united in the general expression to have this law repealed, believing it was largely the original cause of the fright which caused foreign countries to send our bonds back for redemption, and, in addition to the large amount of bonds returned, we were indebted to foreign countries for excess of merchandise purchased. In other words, the balance of trade was against us.

This was seen by large financial institutions some six weeks or two months before the effects were felt throughout the country. Banks and trust companies began to husband their resources some time before the medium trade understood it; large industrial enterprises, early in the season, were unable to secure funds even upon the best collaterals; next came the banks located at a distance, who had heretofore been furnished liberally with funds. They were unable to secure the amounts they desired from large cities; lastly, it extended to both merchant and consumer.

With these combined conditions, our

country extended into one vast vault of hiding places, and statistics show that over \$190,000,000 have been withdrawn from banks in the United States within the last five months, and a general scare spread like prairie fire, and, like fire on the bluffs or mountains in early spring, bounded from city to city.

The resolution of the Wilson bill in the House shows how important a matter it was to eliminate party feeling from financial integrity and principles.

When, in our last letter, we referred to the anticipated addition to the circulation by the national banks, it was based upon a resolution before Congress to permit the national banks to increase their circulation to the par value of United States bonds deposited, and as the actual market value of these bonds was above par (therefore only obtainable at the advance over the par value), and the Government holding its own securities, we, as other business men, did not look for any strong opposition; but when one reads the speech recently made by the author of the resolution they naturally infer it was the intention of the author that it should not become a law, but was evidently intended to bring out opposition speeches.

It is to be hoped, however, with confidence restored, that vaults, safes, lock boxes and bureau drawers will be unlocked and sufficient money for business requirements be put into circulation.

The country has borne the tremendous strain bravely and fearlessly. As a rule, manufacturers who have been compelled to close their works from either financial inability or lack of orders have done so quietly and uncomplainingly. Banks have quietly suspended until redemption was possible, and in most cases no permanent loss has been sustained by depositors.

Occasional unwholesome appeals to prejudice, we regret to say, were attempted in Congress. The most despicable of these ingenious attempts was the atrocious statement made by one of the members that "the condition of the workingman in England was as much superior to that of the workingman in my State as a berth in heaven is to a cot in purgatory."

We wonder if this member has visited the Chicago Columbian Exposition. If he has, we much wonder as to his impressions of the daily visitors. Whether, as a rule, it was the employed, with their families, or the employer?

We would further advise him—indeed, all other visitors to the fair—to visit the Art Building, and in the main entrance, classified under Catalogue No. 48, he will find an impressive and well-executed grouping, called "The Struggle for Work."

The motive for this dramatic group is found in a custom long prevailing in England for the distribution of work when the supply of labor is in excess of the demand. In England, when workmen are wanted for odd work, the superintendent in the factory opens a window and throws out as many tickets as he needs men; those who bring back the tickets get the work. The man in the center of the group is shown in possession of a ticket; an old feeble man to the right is imploring for it, which causes a mental struggle in the strong man's breast; he bends and listens with sympathy. On the right side of the center figure climbs a young man, who is quickened with intense determination to snatch the ticket. A mother with a child has been thrown to the ground in the fury of the struggle; she is trying to protect and pacify the crying baby, while a six year old boy, supposed to be with her, has crawled forward on his knees and is tearing the center figure's al-

ready torn garments. It is the struggle for an even chance to work.

Quite an agreeable contrast to the unfair comparison of the working man of this country made by the gentleman referred to were the remarks made by Bourke Cockran (Democrat). "He held in his hands the Aldrich report, which came to him with the approval of the present Secretary of the Treasury, and from a Democratic Bureau of Statistics, the accuracy of these figures has never been impugned, and it showed that never in the history of human civilization had wages been so high, and by the figures of the Aldrich Committee, it has shown they enjoyed the largest proportion of that which they produced than any other class of labor has ever enjoyed in the history of the world."

The two speakers professed to be of the same political faith; the difference being one was an honest representative of the body he represented; the other partisan in sentiment, feeling and expression.

San Francisco.

HUNTINGTON HOPKINS COMPANY.—

We find upon looking over articles from other cities throughout the country on the condition of trade, that correspondents, as a rule, hold the same views as ourselves. We feel, as we think others do, that a settled policy of Congress, whether the majority of the country agrees with it or not, is better than no policy at all, and as soon as this is decided upon an easier, more secure feeling will prevail, and business will improve. Sales continue light; in fact, it is best they should until money becomes more plentiful and purchasers see their way clear to pay for what they buy. Since our last collections have somewhat improved; it would not be the fault of the average credit man if they did not, as this department of most mercantile houses has been very diligently looked after. Locally we are looking forward to the coming midwinter fair with anticipations of a lively influx of visitors from all parts of the Pacific Coast, if not from the far East. Our winters in San Francisco are really the most delightful part of the year, and the climate is milder than at any other time. This fact, together with a probable low passenger overland rate, will, we think, induce many of our Eastern friends to come to the coast, and while our exposition will not compare in size with the great World's Fair at Chicago, it will, no doubt, as far as it goes, prove fully as interesting.

Notes on Prices.

Wire Nails.—The Wire-Nail market has not developed any specially new features during the past week. The mills, generally, are resuming operations, though not to their full capacity. Quotations continue unchanged at \$1.50 for carload lots, f.o.b. mill, a price which is pretty firmly maintained, most of the manufacturers not showing a disposition to shade it. The volume of business is small, but some orders, principally to replenish broken stocks, are being sent in. The trade, notwithstanding the possibility of advanced prices as a result of agreement between the manufacturers, are not placing stock orders to any considerable extent, but are limiting their purchases to their immediate requirements. Small lots from

store in New York are held at about \$1.65.

Chicago, by Telegraph.—Orders for Wire Nails have been more numerous and a little large during the past week, but prices show no improvement. Efforts made by some manufacturers to increase their sales have had a tendency to shake the growing belief in firm prices. The low rates named, it is true, have been for spot cash and immediate shipment, but the market now seems to be settling down again to about \$1.50 to \$1.55, Chicago. Jobbers are doing a good business at \$1.55 to \$1.60 from stock.

Cut Nails.—The Cut-Nail market continues steady on a basis of \$1 05 for carload lots at mill, with concessions in special cases. The volume of business is moderate, and for the most part confined to small lots to meet the pressing needs of the trade.

Chicago, by Telegraph.—Manufacturers of Cut Steel Nails report a continued flow of small orders, which they think is indicative of the character of trade to be expected this fall. They are not looking for a much larger volume of business in view of the conditions prevailing in the commercial and financial world. Prices are maintained at \$1.20 to \$1.25 Chicago, for factory lots. Jobbers are doing a fair local trade, but have little demand from outside buyers and are selling small lots at \$1.30 from stock.

Barb Wire.—There has been as yet no considerable increase in the demand and the volume of business is light. Prices are, however, pretty well maintained on a basis of \$2.45 to \$2 50 for carload lots at mill for Four-Point Galvanized. This figure, however, is shaded in some cases and with perhaps a little more freedom than during the past few weeks. More trade is noted among Barb-Wire manufacturers, but they are not yet in receipt of enough orders to justify the starting of all the idle factories. Prices range from \$2 45 to \$2.60 for Galvanized Barb Wire, according to quantity and brand. Jobbers report a considerably better trade and more inquiries coming in from other localities which have hitherto not been buying much. They sell small lots from stock at \$2 65.

Cary's Box Strap Stretcher.—Cary Mfg. Company, 5-9 Elm street, New York, are offering the trade their Box Strap Stretcher for tightening straps on packing and other cases illustrated in issue of August 31, at 75 cents each, less 33½ per cent. discount, when ordered in fair quantities.

The Clark Check Perforator—This article, a description of which was given in a recent issue, as manufactured by Clark & Roberts, Indianapolis, Ind., is sold at \$15 net.

Steel and Wood Goods.—In a circular, dated September 1, the Withing-

ton & Cooley Mfg. Company, Jackson, Mich., announce the following changes in list prices:

Ivanhoe Socket with Mirror Blade to be.....	\$11.00
No. 5 Solid Shank Onion or Nursery Hoe to be.....	7.50
No. 000 Snath to be.....	10.50
No. 00 Snath with Adjustable Crow Hole to be.....	10.00
No. 00 Snath with Solid Plate and Fixed Holes to be.....	9.50

They refer to the latter as being the old style, but with many buyers and users it is coming into favor as being practically as good as the Swing Socket and other similar devices. The discounts on these goods remain unchanged.

Cork Extractor.—The Magic Cork Extractor, manufactured by Magic Introduction Company, 321 Broadway, New York, and illustrated in this issue, is sold to the trade at \$2 per dozen net, or \$22.50 per gross.

Glass—While some improvement is noticed in the Glass trade, it is far from satisfactory. Jobbers find demands for small lots quite frequent, resulting from the lateness of the season and the necessity of replacing broken Glass for the winter. Stocks of Glass are broken in assortment, in manufacturers' hands, resulting in the handling of imported Glass by some jobbers to a larger extent. Foreign factories find a better market in the United States for disposing of their surplus product than at home, owing to the depressed condition of trade on the other side. Manufacturers find it difficult to make collections, and nothing further has been done about the wage scale. Stocks of Plate Glass are being gradually reduced. Quotations remain unchanged on all lines of Glass.

Export Notes.

MERCHANTS, manufacturers and others now doing business with the United States of Colombia, or desirous of knowing more of that country with a view to cultivating and developing commercial relations with it, will be enlightened and instructed by reading a volume entitled "Colombia," prepared for gratuitous distribution at the exposition in Chicago. It has been compiled by Hon. Climaco Calderón, Colombian Consul-General and member of the Intercontinental Railway Commission, 24 State street, New York. In addition to 122 pages 9 x 6 inches, there are 41 illustrations giving views of cities, public and private buildings, engineering works, bridges, railways, street and market scenes, plantations, &c. The letterpress treats of area, physical geography, resources, cities, history, institutions, revenues, money, agriculture, fisheries, manufactures, mines, mining, commerce, transportation, &c., the whole supplemented by a complete map of the Republic. The gold output in periods from 1537 to 1892 inclusive is given at \$854,869,173; silver for the same time, \$58,626,000.

Charles Churchill & Co., Limited, London, in addition to their main business of introducing American machinery and tools in the United King-

dom, are doing quite a traffic with Continental houses through their several agents in leading centers. They now have a special illustrated catalogue in course of compilation for use in Austria, which will be printed at Vienna in the language of that country. It is in charge of their resident agent there, and will contain goods adapted to that country's requirements.

R. Grassi of Milan, Italy, the commission merchant in Hardware and metals, after spending several months in this country, sailed for home on Saturday.

Arrangements have been made for the establishment of a new line of six steamers to ply between Liverpool and Tampico, Mexico, touching at New York and Baltimore.

Quick Transportation.

WE ARE ADVISED that the Trades League of Philadelphia are taking up the matter of time made on shipments of goods, the form given herewith being printed on postal cards and used for this purpose:

1. Shipper's Name.....
2. Date of Shipment.....
3. Destination.....
4. Name of Railroad or Freight Line Used.....
5. Date of Arrival at Destination.....
6. Signature.....Consignee.

On the reverse side of the cards is the printed address of the general transportation agent of the Trades League. The first four items of these cards are filled out by the house shipping the goods, and the cards are sent by them to the consignee. The date of arrival of the goods and the signature of the firm receiving the goods are filled in by the consignee, and the cards mailed by him to the transportation agent. When the cards are received by him, his name and the date of receipt are stamped upon them, and they are returned to the house which shipped the goods. Using this system is considered a very important step, as the experience of shippers has heretofore been that when they inclosed their own postal cards to customers asking for information the retailers do not seem inclined to furnish it, probably through thoughtlessness on their part, and because they do not realize the necessity of giving the shippers all the information possible to aid in securing good railroad service. It is a common occurrence for shippers to receive requests to trace certain shipments, whereas consignees do not seem inclined to render the proper assistance in this direction when called upon to do so.

Wallace & Sons.

WALLACE & SONS, 29 Chambers street, New York, are about to send out Catalogue No. 7, fully illustrating the Lamp Fixture, Table and Art Goods department of their business. In its 141 pages will be found full lines of Banquet, Boudoir, Piano, Library, Hall and Table Lamps, in onyx, gold and silver plate, &c.; Dressing and Jardiniere Stands, Chandeliers, Brackets, Spring Extensions, Five o'Clock Teas, Blazers, Tables,

Cabinets, Pedestals and Chafing Dishes. There are also Burners, Lamp Trimmers, Extinguishers, Police Lanterns and Plantation Lamps. Facing the title page is a bird's-eye view of their works at Ansonia, Conn. The book is printed on fine paper and for greater convenience doubly indexed.

Convention of Trade Organizations.

AT THE CALL of the New York Board of Trade and Transportation a convention will be held September 12 at Willard's Hall, Washington, D. C., at which it is hoped the commercial organizations of the country will be fully represented. The object of the gathering is to emphasize the judgment of business men in all lines of trade that the Sherman law should be immediately repealed. Arrangements have been made for reduced rates at hotels and on the railroads, and efforts are being made to have the convention thoroughly representative of business interests. The matter is deserving of the prompt and enthusiastic attention of Hardware organizations, who should exert their influence in favor of a sound financial policy. Full information in regard to the matter may be obtained from Hon. Darwin R. James, 203 Broadway, New York.

Branford Lock Works Catalogue.

THE YALE & TOWNE MFG. COMPANY, Stamford, Conn., and 84-86 Chambers street, New York, lessees of the Branford Lock Works, have just issued an illustrated catalogue of the Branford Lock Works. This is a companion volume of the No. 14 Catalogue of the Yale & Towne Mfg. Company, issued last spring, the reception of which by the trade was so favorable as to make evident the wisdom of the new departure which it marked in the size and character of trade books. It is remarked that the two lines of goods being handled jointly and under the same control, and each being supplementary to the other, the identity in size and character of volume is especially appropriate. In the preface to the new catalogue the product of the Branford Lock Works is referred to as embodying a complete line of Locks and Builders' Hardware pertaining to the equipment of buildings of all kinds, the goods ranging in quality from the cheapest now usually demanded up to and including a great variety of others of excellent design, construction and finish, and covering all grades except those of the most expensive kinds. Especial attention is called to a line of cylinder Locks with flat keys, first presented in this catalogue, also to new designs of bronze Hardware, in various finishes and in several ornamentations. In this catalogue the effort has been not to expand the line, but to contract it by the elimination of useless variations in size and style, and thus to assist the dealer by reducing the variety of goods he needs to carry in stock to the lowest point compatible with the actual requirements of the trade. The catalogue is accompanied by a price book, with the goods numerically arranged and indexed for Locks and Latches, Locks in sets, Key Plates and Escutcheons, Blank Keys, Knobs and Hardware. The number, list price and catalogue page are given, with space

for net prices, which the trade is requested to apply for.

The Bicycle Display at the World's Fair.

(Continued.)

THE SERCOMBE-BOLTE MFG. COMPANY of Milwaukee, Wis., have at the rear of their extensive exhibit a scale from which is suspended one of their special Sanger racers, the scale registering the weight of 17 pounds. It is built without vertical adjustment of the saddle, although the saddle may be moved back or forward on the frame. The cross frame gives great rigidity and strength, aided by the removal of the seat post. In addition to the light racer on which Sanger, the Milwaukee racer, has competed against some of the crack riders of England and America, they have the Lightning Messenger racing wheel, Telegram light and full roadsters and Ladies' Telegram, shown in light blue enamel. A new finish introduced by them is the imitation oxidized silver, making a striking and very unique effect. A feature of this exhibit is the displaying of an entire wheel brazed, without either the enameling or nickel plating, the idea being to show the excellent material and high grade of workmanship employed. Separate parts are also shown, including the semi-hollow rim.

THE DERBY CYCLE COMPANY of Chicago show their Model B, C and D wheels in black, red, blue, white and yellow enamel. These wheels are all raised upon revolving supports, thus enabling visitors to turn and inspect any part of the wheels from any desired angle. These wheels are supplied throughout with the quadruple reach, obviating a tendency to twist and warp, thus throwing the wheels out of line. In a handsome case at one end of the display many separate parts of the Derby Company's machines are shown.

THE LOZIER MFG. COMPANY of Toledo, Ohio, are showing the Cleveland wheel, made by H. A. Lozier & Co., Cleveland, Ohio. Their booth compares favorably with any of the others. Upon a pivot fastened in the center of a table rests a regular Bicycle wheel equipped with one of the Cleveland thread pneumatic tires and rim. This is one of the latest inventions in Bicycle manufacture, enabling a rider to repair a puncture in five minutes, and doing away entirely with the inconvenience of carrying and employing heavy and cumbersome tools, the entire equipment of the Cleveland fitting into a small saddle bag. The wheels shown are their Nos. 4, 5 and 6, being their regular roadster, which weighs 30 pounds, stripped, ladies' wheel and their track racer. These machines are shown in full nickel, black enamel and marbled finishes, the latter being an experiment of the Lozier Company introduced the present season and meeting with success. They make a special feature of colored wheels, and furnish them at the same figure as the nickels. Those displayed are in cream, white, green, blue, red, drab, &c. Immediately opposite the main exhibit, and easily seen from the main floor, are four wheels revolving around a central pivot, which in turn revolves. An entire wheel, in parts, is displayed in three showcases, the chain being strung in the shape of the word Cleveland.

THE LAMB KNITTING MACHINE COMPANY of Chicopee Falls, Mass., have an even half dozen of their Credenda wheels, manufactured for Spalding & Bro. of Chicago. These wheels comprise their regular road wheels for gentlemen and ladies, in full nickel finish, and the road racer and boys' machine,

in black enamel. The hubs, forgings and numerous small parts are shown to advantage, while Spalding & Bro. have also taken advantage of this opportunity to show riders the simplicity and utility of the Perfect Trouser Guard manufactured by them. Nearly a hundred boxes of the Chain Lighting Lubricator for safety chains are used to form the word "Spalding" against a blue background, completing an exhibit which, though not large, is attractive in its originality.

THE CENTRAL CYCLE COMPANY of Indianapolis, Ind., are showing a complete set of their wheels, from the Ben Hur, which they placed on the market three years ago, to the latest improved Central. These wheels are serviceable and handsome, and compare favorably with many machines which sell at a higher figure. The goods show up nicely in black and green enamel and nickel and copper-plate finishes. The ladies' wheel made by the Central Company has met with a good sale. The forward wheel is 30 inches in diameter, while the rear is 28 inches. Weldless steel tubing and drop forgings are used. The double diamond is also used, imparting additional strength to the joints. The Central Company have placed in charge of their exhibit one of St. Louis' most prominent cyclists.

THE YOST MFG. COMPANY of Toledo, Ohio, have a most picturesque display. Looking across from the west gallery of the Transportation Building or up from the ground floor the sightseer beholds two paintings artistically draped, one representing a seaport with its docks and ship at anchor, while the other shows a mountain scene in autumn. High up in the air, in both pictures, a falcon, the bird of war, is seen flying, carrying in its talons one of the Falcon wheels manufactured by the Yost Company. Upon a raised stage, which has a handsome painting for its background, are arranged the four wheels which the company make—viz., their No. 1 Falcon, Falconess, Falcon Jr. and Falcon Jr. Combination. These goods are shown in black enamel and nickel finishes. Unable to secure the space they requested and desired this company have well proven how effectively and to what advantage small space may be utilized.

THE HARTFORD CYCLE COMPANY of Hartford, Conn., have adopted a novel method of entertaining visitors and at the same time doing away with the usual attendant. At the front center of their exhibit a large frame contains some 20 different views, illustrating comparative curves of chain tension with elliptical and round gears for half a revolution of the crank, while at the top of the frame rests a phonograph with tubes for half a dozen, from which a lecture on the elliptical gear may be heard. Samples of their C and E patterns are on exhibition, in enamel and nickel finishes, supplied with both the elliptical and round gear, while separate parts form handsome designs beneath a large photograph of the office and factory in the Nutmeg State. These goods are handled in the West by the Pope Mfg. Company, under whose banner the Hartford's exhibit is displayed.

WESTERN WHEEL WORKS of Chicago hold up their end of the long line of Bicycle exhibitors with one of the largest and most extensive displays, embracing 19 different styles. Nearly 1000 square feet are occupied, around which extends a bright nickel-plated railing, with entrances from the two aisles on which it fronts. In the center of the space handsome posts support a canopy formed of the starry banner, inclosing an office and reception

room, supplied with handsome rugs and chairs for the accommodation of visitors. Across the aisle and looking down into the space below are two screens composed of steel tubing, Velocipede and Bicycle wheels, with the words "Western Wheel Works" artistically arranged. Of the many styles shown among those which command special mention are the Black Hawk, Crescent, Juno, Rob Roy, Pet and Combination Juniors. Their ladies' Black Hawk is a pronounced improvement over their '92 ladies' wheel, not the least advantage being its light weight, weighing only 32 pounds with all on. The wheels shown were not produced with the intention of displaying them, but are taken direct from stock. Both cushion and pneumatic tires are shown. In addition to their Bicycles the Western Wheel Works show samples of their Invalid Chairs and Baby Carriages with regular cushion tires.

THE KENWOOD MFG. COMPANY of Chicago have a striking advertisement hanging in the center of their space, in the shape of a pneumatic tube, inflated, measuring 7 feet from rim to rim. Within the inner circle a placard occupies the entire space, on which a torch is emblazoned, lighting up the words "Light and Beautiful," characteristics of the Kenwood wheels which stand about. The company believe that the competition is upon the regular wheels, and have made their exhibit from the wheels which are found in their warerooms. Their method of fastening the pedal crank, as well as the cup which encases the balls, is especially referred to, while the frame is made unusually strong by a continuous truss piece. The Kenwood roadster, road racer, path racer and other styles are displayed in the popular finishes.

THE STOKES MFG. COMPANY of Chicago have erected a booth in oriental style. The entire space is surrounded by a handsome nickel-plated railing. The sides of the booth are hung with oriental tapestries, no two curtains being of the same design. A highly polished hard wood floor is covered here and there with fine mats, and chairs are placed for the accommodation and comfort of callers. The walls are hung with photographs of prominent wheelmen, including Zimmerman, Tyler, Johnson and others. The exhibit of wheels comprises 25 different styles, showing the company's racers, road racers, light roadsters, double diamond, and ladies' single and double frame wheels. These are shown in nearly as many colors as the rainbow boasts. Some of those which attract especial attention are the full gold plate, gold plate with black and white trimmings, full nickel, nickel-plate with red, maroon, green and purple trimmings, the full polished copper plate and all white. Hanging between two columns of the pavilion is their No. 27 Sterling wheel, covered with mud, but without a break, which H. H. Wiley rode from New York to Chicago in ten days. On the opposite side of the entrance may be seen the Union wheel ridden from Denver to Chicago in equally good shape and time.

The description of the exhibits of foreign wheels we leave to our next issue.

THE AMES SWORD COMPANY, Chicopee, Mass., commenced running upon half time the last week in August. The company have lately been running upon two-thirds time. The company's plan is to give work to half their employees three days in the week and three days to the other half.

Grange Stores and the Hardware Trade.

THERE IS A GROWING dissatisfaction among retail Hardware merchants in the West who are doing business in States where Granges, Farmers' Alliances and similar organizations exist. This dissatisfaction finds forcible expression in letters which we have recently received touching upon this subject. The trouble seems to be especially pronounced in Illinois, Iowa, Kansas and Nebraska, but there is a good deal of complaint from other States. The stores are referred to as not only taking trade from the merchants, but cause a demoralizing of prices after they cease to exist. A correspondent, referring to the prices at which these stores buy goods and to their short career, remarks:

We know that Grange stores and Alliance committees do buy goods from manufacturers at about the same prices that regular dealers can. If they continued in business for a term of years we would not complain, but they continue just long enough to cause dissatisfaction among consumers, and then we have to suffer for it.

GRANGE STORES.

Grange stores are often in charge of those not qualified to succeed in any business, or those who bankrupt the establishment by personally absorbing the cash. For these and other reasons the stores are frequently given up, as in a case mentioned by a firm in Illinois, as follows:

Our Grange people tried it in our county but have given it up, as they had a class of goods sold them that was not profitable. Talking with a number of our farmers they admit that it was better to deal with their home merchants. Once in a while this cheap John business breaks out like the smallpox, but never lasts long.

CATALOGUES FOR CONSUMERS.

A greater source of annoyance and loss than local Grange stores appears to be from large concerns in Chicago, St. Louis, Atchison and other cities who cater to the consumers' trade, and whose literature is found in the hands of farmers and those living in small towns. The circulars and catalogues sent out by these concerns—among which those of a well known Grange house in Chicago are the most often met with—contain net prices and discounts which, if met by local merchants, often leaves them less than 5 per cent. profit on the goods sold. A firm in Nebraska call attention to the fact that catalogues from such houses often contain prices which are even lower on certain articles than they are able to buy the same article for from their regular wholesale dealers. They state that this is especially true of guns, ammunition and all sporting goods. These catalogues are often misleading, as the class of persons to which they are sent are not posted on the regular prices at which many of the goods are sold, especially those which they are not in the habit of buying. This point is strongly brought out by a prominent concern in Kansas, in the following language:

A customer in looking through a catalogue of this kind sees many things he wants and takes it for granted that all the prices are much lower than the same goods can be bought for of his home merchant, because some particular item happens to be lower, and thus sends in his order for many things that he would not think of purchasing otherwise.

DEMORALIZING TRADE.

Another unfavorable result of these catalogues is mentioned by an Iowa firm, as those receiving them expect their local merchants to meet the prices quoted. In referring to this subject this firm remarks:

They have these prices and discounts, and as a consequence if we try to get a reasonable profit out of our goods the customers will quote these Grange house prices, which are usually based upon lots of a dozen, and expect us to sell them one article at the same price.

The existence of these stores causes loss of trade to local merchants, dissatisfaction among customers regarding prices, and the sending away of cash for the purchase of goods that should remain at home, while customers who have not the money to send away for goods make a convenience of their local merchants and expect them to extend almost unlimited credit. One correspondent sums up the evil of this system as follows:

It is annoying and embarrassing, and robs the retailer of his legitimate profits, destroying trade and confidence.

WHAT THE TRADE SAY.

An Iowa firm relate a circumstance which occurred in their store, showing how insult was added to injury, as follows:

A farmer came in and bought some Binder Twine, having it charged. After we had closed the deal he had the audacity to tell us that if he had had the cash he would have sent to a Chicago Grange house and bought it as cheaply as we could.

Another Iowa merchant, after referring to retail catalogues being the principal source of annoyance, thus reviews the situation:

These large and full catalogues quote goods at prices that are considerably above the wholesale prices, but considerably below the retail price. We also find that certain of our customers whom we are carrying for good-sized bills buy more or less from these catalogues. But we have more trouble with prices quoted than anything else. These parties are continually telling how they can buy and get prices, thus demoralizing trade and creating dissatisfaction.

A prominent firm in Illinois also experience trouble from these catalogues in connection with the tool trade, as is seen from the following:

Our principal annoyance from the so-called Grange houses is in the tool line. They quote by catalogue prices almost as low as we can buy the goods, and our customers expect us to meet the prices and trust them for the goods. Could we get the same prices and get the cash we would be better pleased, but we cannot.

INJURY TO BUSINESS.

A South Dakota firm notice that in nearly every instance the class of customers who send cash away for goods

until their funds are exhausted and then ask for credit at home, are much poorer pay than those who buy their goods from their home merchants.

Among the goods which local merchants are deprived of the sale of are included Barb Wire, Binder Twine, Sporting Goods, Locks, Butts, &c., groceries, clothing, and in fact nearly all the goods used by their customers. In some locations consumers get their coal, salt and flour shipped to them by the carload.

This mode of dealing is unjust both to the retailer and the consumer. The goods in many cases prove to be of inferior quality, furnished by second and third class manufacturers, and the purchaser has no redress, as the money was sent with the order. On the other hand, if the merchant meets the catalogue prices, he is selling reputable goods at the price of inferior ones. Referring to this phase of the subject an Iowa merchant remarks:

Buying by catalogue does the consumers less good than they expect. The goods are of inferior quality, about which they cannot complain and which they cannot afford to return on account of the extra express charges, while the extra expense of getting them nearly always makes it a dear bargain.

A Kansas concern finds the goods of such houses inferior and their trade unstable, while in their opinion they will always exist. Such establishments are characterized as warts and leeches on the trade, and as such die out.

THE JOBBING TRADE.

From a letter already quoted, the view is taken that the Grange houses injure the trade not only of the retail dealers, but of the jobbers as well. That some jobbers look at the matter from the same standpoint is shown by an incident related by another correspondent. Referring to a line of Guns which has been sold by a Chicago Grange house at about jobbers' prices, the correspondent states that the Chicago jobbing house from which he buys most of his goods have received many complaints concerning the matter. He then adds:

The jobbing house brought the matter to the attention of the manufacturers, but without remedy. The jobbers, therefore, put the price of the goods down to actual cost, and for several months have been selling them at these prices, with the view of forcing the manufacturers either to stop selling to the Grange house, or to sell at a price that would protect the jobbers.

THE RETAILERS' POLICY.

The Grange-house difficulty is not a new one; but it is interesting to note that, while retailers have found no real remedy for the trouble, some have attempted in different ways to mitigate the evil. An advocate of a cash business in Iowa writes as follows:

I have done a strictly cash business since May 1, 1889, and find I can compete with the Grange stores, as I often have to figure on a bill of goods some farmer wants, he being posted with Grange stores' catalogue prices. I always make the sale when given the opportunity of figuring, as I can and do

make closer prices than if doing a general credit business. There is in our county a large Grange organization, but I count among my customers many who belong to this organization, and they tell me my prices are about the same as they have to pay at the Grange store, but that in other lines of goods they can save a large percentage.

Another Iowa firm attempt to catch the business that would go to Grange stores in the following manner:

When we find one of our customers wanting goods from a Grange store we try to get from them their prices, and duplicate them, to which we add freight and exchange. We also try to treat our customers so well that they will not leave us.

RETALIATION.

An Illinois company write regarding the plans pursued by them as follows:

We find competition in retail Hardware stronger every year and prices lower—profitless. This state of affairs is caused largely by so-called Grange houses, who sell some lines of Hardware at nearly the same price as jobbers charge us. We have adopted two methods to overcome this: First, we have been compelled to get better prices on goods so touched, and if the jobbers from whom we usually buy those goods cannot sell us so we can make a profit we seek factory or jobber whose territory we are not naturally in and who to get a little trade without expense are willing to divide profit with us. After getting price we adopt the second method—viz., meet the price made by Grange houses. We believe if retailers generally would adopt that plan in time we could handle largely the trade controlled by Grange houses.

A Nebraska firm pursue a course of retaliation, as when they know a party is buying from a Grange house he has to pay a good long price for what he does buy of them. If he makes any objection they advise him to buy from the Grange house that he is in the habit of buying of.

WHO IS TO BLAME?

The cause of this trouble—of Grange stores being able to quote low prices—is laid at the door of the manufacturers and jobbers by the majority of our correspondents, and the remedy suggested by them is the forcing of manufacturers and jobbers to discontinue selling to Grange houses and department stores. This, it is thought, can be accomplished by concerted action on the part of retailers in refusing to buy goods from concerns who persist in selling such parties. Individually some retailers are pursuing this course, and have been for some time. One Hardware merchant suggests that retailers refuse to sell to those who patronize Grange houses and cut them off entirely. A South Dakota firm is of the opinion that "manufacturers are a good deal like bankers, they want to hog the earth and do not see that it is to their own future destruction."

ORGANIZATION.

Another correspondent makes the point that manufacturers are dependent to a certain extent on the retailer to place their goods before the public, even though the retail trade is reached through the jobber. Also that it is to the manufacturer's interest to protect

the retailer by not selling Grange stores at a price less than they could buy the goods from a regular jobber. An Illinois merchant is of the opinion that if the jobbers would interest themselves in the matter they might be able to control the manufacturers, but that the handle of the retailers' axe is too short to reach the root that needs chopping off. Several correspondents concur in this idea, that it is possible for the jobbers, through their organizations, to refuse to buy goods of manufacturers who sell to Grange houses and department stores. A plan of organization and action is proposed by a Nebraska Hardwareman, as follows:

To remedy would, in my opinion, require concerted action, willingness to devote time to investigate, and a contribution of a few dollars; above all, organization. Allowing that we have properly elected officers, it behooves the dealer in a Nebraska town to be determined to give John Smith's Locks no place on his shelves, when Sam Jones of Pekin, Ill., complains to the secretary that John Smith has sold direct to a contractor or to a department store, because, naturally, the Nebraska man wants all the other dealers to help him oppose the Atlantic & Pacific Stove & Mfg. Company, because they shipped a Stove direct to some one in his town. When I refer to investigating I mean that no guessing that this or that concern did so and so; facts must be reported. Let the secretary send out a monthly or semi-monthly bulletin of authenticated complaints; we, as dealers, will then know whether or not we should do any business with the salesman who has handed us his card. We can stop this ruining of trade if we join hands; the course to pursue is the easiest solved; getting tradesmen together is the most vital.

Trade Items.

THE ANTHONY WAYNE MFG. COMPANY, Fort Wayne, Ind., have prepared a repair chart, for hanging, of the parts of the Anthony Wayne, Wayne American, Western Star and Wayne Combination Washers. On one side of the chart are illustrations of the parts, numbered or lettered, and on the other side the names of the part with the price of each. This arrangement simplifies the ordering of repairs, as well as acquainting the merchant with the price to be charged.

JOSEPH T. FARRINGTON, Hardware dealer, 188 Grand street, New York, in common with many deserving business men, has suffered from the effects of a tight money market. About 18 months ago he indorsed notes for a friend, at the same time receiving securities as collateral that in his judgment would cover any possible loss. The stringency in financial matters caused the holders of the notes to look to him for payment. Forcing the collaterals on a greatly depressed market failed to realize anywhere near enough to satisfy claims against him as an indorser. Feeling, under the circumstances, that his first duty was to his own creditors, he placed himself in the sheriff's hands, and on August 28 his stock of goods passed out of his hands. He is still doing business at the old stand and will so continue, having no doubt that eventually he will be able to pay every one in full. In the meantime he has the practical sympathy of the trade, as many houses are supplying him with goods.

WE ARE INDEBTED to Harrington & Knight, Hardware merchants of Fargo, N. D., for a souvenir of the Fargo fire,

which, on June 13, 1893, consumed block after block of fine buildings. The book contains photographs of the burnt district in Fargo before and after the fire, with a detailed description of the damage done. The above firm's place of business was destroyed among the rest. The total amount of insurance on the property destroyed was \$1,396,000, which gives a faint idea of the destruction wrought.

UNDER DATE OF SEPTEMBER 1 announcement is made that the business of the Ferris Hame Company, Linwood, Ohio, will hereafter be carried on under the name of the J. A. DeArmond Mfg. Company, Mr. DeArmond having purchased the interests of S. M. and Wm. Ferris. It is stated that it will be the aim of the new firm to fully sustain the character of the old house, which has been in existence for the past 40 years.

WE CALL ATTENTION to the advertisement in our present issue in which the Arcade File Works show cuts of their new works at Anderson, Ind., also cuts of their offices and warehouses at 83 Reade street, New York, and 23 Lake street, Chicago. This company, we are advised, have been running their machine department with a largely increased force, building new and improved machinery recently invented by Alfred Weed and controlled exclusively by the above company.

THE ST. LOUIS REFRIGERATOR & WOODEN GUTTER COMPANY, St. Louis, Mo., manufacturers of the Lu-mi-num Bicycles, have issued a challenge to any maker of first-class Bicycles in the world, for a test of strength between their aluminum machine and any steel tube frame. Should the judges not decide that the Lu-mi-num is by far the strongest frame, the manufacturers agree to contribute \$500 to any charitable institution the manufacturer of such Bicycle contesting may name. If, however, the judges decide that the Lu-mi-num is twice as strong as the steel tubing frame contesting, the manufacturer of such Bicycle shall contribute \$500 to any charitable institution named by the Lu-mi-num makers; if three times stronger the amount contributed shall be \$750. The contesting machines are to weigh 30 pounds and under. E. C. Stearns & Co., Syracuse, N. Y., have accepted the challenge, and the result will be awaited with much interest by all connected in any way with Bicycles.

AT THE Saw, File & Tool Works of Henry Disston & Sons at Tacony, Philadelphia, business is beginning to assume some of its old time activity. Samuel Disston states that there was an extraordinary collapse during July and August, orders being countermanded from all directions, while remittances shrank to an alarming extent. But things are beginning to assume their normal condition, countermands being withdrawn, with a very fair sprinkling of new business. Mr. Disston is not inclined to attribute the scare to any one particular cause, but to a number of influences, all of which seemed to culminate during the mid-summer holidays. The contention between banks in the different cities was also an unfortunate feature and interfered greatly with remittances, New York against Philadelphia, Chicago against New York, and so on all around, but with easier money there is reason to believe that business will soon resume its natural channels, if not its old-time proportions. So far as this firm were concerned they endeavored to meet the wishes of their customers by allowing cancellations, or by cutting down quantities, as seemed most desirable. Mr. Disston remarked that their first mail this week brought

in more orders than any three days of last week, and, as they are not carrying much stock, he is in hopes that they will be able to start up in all their departments at an early date.

W. W. PRIOR & Co., 81 Chambers street, New York, are Eastern agents of the Ohio Lantern Company, Tiffin, Ohio, and carry a stock for immediate delivery, and supply the trade at factory prices. The company's announcement will be found among the advertisements in this issue.

THE WITHINGTON & COOLEY MFG. COMPANY, Jackson, Mich., in a circular recently issued, state that, notwithstanding the untoward conditions of finances and business, their works are running and they will be in the market to sell steel and wood goods. They also congratulate the Hardware trade on their demonstrated strength to withstand the stress of the times.

DEWITT HEERMANCE, a manufacturer of Carriage Hardware at Poughkeepsie, N. Y., was fatally injured last week in the railroad accident on the Harlem road, which occurred at Paulding, N. Y.

Prize Competitions.

Prize Competition No. 27 (Reopened).

Local Associations of Merchants.

This competition closed July 8, but in view of the exceptionally few replies which have been received from the trade and the importance and practical nature of the subject, we have reopened it, and extend the time up to which responses will be accepted to September 16.

Some points in regard to the subject appeared in the announcement concerning the competition in our issue August 24, and will probably be of service to those who are intending to compete.

The committee to whom the papers in Competition No. 20 were referred have awarded the prizes as follows:

First prize to B. H. ROSE.

Second prize to C. O. F. YOUNGSTROM.

Third prize to C. L. CHALMERS.

Manufacturing.

CHESS, COOK & CO., Rankin, Pa., Expanded Metal and Nail manufacturers, posted a notice at their works August 31 inaugurating a general reduction in wages, the cut ranging from 10 to 18 per cent. Over 100 men are affected by the reduction.

THE BOSTON FERRULE COMPANY, Boston, Mass., are erecting a six-story brick building on A street, South Boston, Mass., which will be ready for occupancy some time late in the fall. The first floor, with an area of 13,000 square feet, will be occupied by the Boston Toe Calk Company for the manufacture of Toe Calks. This concern are building improved machines, which they claim will turn out 40 Toe Calks each per minute.

THE PHILLIPS INSULATED WIRE COMPANY have broken ground at Darlington, R. I., for the erection of a new building.

THE CHICAGO SCREW COMPANY, 96 West Washington street, Chicago, have been adding considerably to their manufacturing facilities of late. Superintendent Charles E. Roberts has designed a new type of machine for cutting screws, of which six have been constructed and more are being completed as quickly as possible. It is stated that these machines are wholly automatic, require no skill to operate

them and turn out screws with much greater rapidity than the old style machine.

DURING the time the works of the New Castle Wire Nail Company, at New Castle, Pa., were idle, extensive repairs were made. A new addition was also built and about 40 new double Nail machines were placed in it. These machines were made during the month of July in the machine shops of the firm.

THE LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo., have secured the contract for a double elevator inclosure for the De Give Building, Atlanta, Ga. The work is to be done in oxidized copper and black finish, after designs made by the Ludlow-Saylor Wire Company, especially for this contract.

YALE & TOWNE MFG. COMPANY, Stamford and New York, were recently awarded the contract for furnishing the Post Office Department of the United States Government with lock boxes for the fiscal year ending June 30, 1894. This is the sixteenth year, we are told, they have had the supplying of this class of goods. The award was made, we are advised, on the merit of the boxes, the company not being the lowest bidders.

Price-Lists, Circulars, &c.

SICKELS, SWEET & LYON, 35 Barclay street, New York: Fall edition, 1893, No. 6 catalogue. Illustrations and list prices are given of Shovels, Scoops, Mica, Stove Boards, Fire Shovels, Cover Lifters, Stove Pipe, Dampers, Coal Hods, Coal Sieves, Horse and Toilet Clippers, Hammers and Sledges, Scales, Pliers, Hair Curlers, Coat and Hat Hooks, Mattocks, Hatchets, Axes, Weather Strips, Curry Combs, Skates, Lanterns, Wood Saws, Snow Shovels, Sleigh Bells, Guns, &c. The above address is also the New York office of Sickels, Preston & Nutting Company, Davenport, Iowa.

L. A. SAYRE, Newark: Catalogue and price-list No. 3 of Hardware specialties and mechanics' tools. Illustrations show Peach and Apple Parers, Peach Pitting Spoons, Belt Fasteners, Ice Creepers, Shingling, Half, Lathing, Claw, Barrel and Broad Hatchets, Ice Hatchets and Axes, Broad Axes, Adzes, Spanish Axes, Trowels, Punches, Claw Tools, Tack Hammers, &c.

MANHATTAN BRASS COMPANY, 44 Murray street, New York: Rolled and Sheet Brass, Bronze, and cold-rolled Copper in rolls and sheets; Brass and Bronze Wire, Brass, Bronze and Zinc Tubing, Brass Molding, Burners, Lamps, Lanterns, Lamp Fixtures, Fenders, Fire Sets, Andirons, Coal Hods, Door Rails, Jack Chains, &c. Illustrations are given in their catalogue No. 16 of Tubing, Moldings, Chandelier Bands, Embossed Brass, Brass Checks, heavy Oilers, Lamp Burners, Lamps, Fenders, Folding Screens, Fire Sets, Andirons, Coal Hods, Wood Carriers, Fire-Place Frames, Cane Stands, onyx top Brass Tables, Picture Easels, Grill and Strap Work, Baulsters and Standards, &c.

RICHARD ECCLES, Auburn, N. Y.: Carriage Forgings. The illustrations of carriage makers' forged irons include Shaft Couplings, Coupling Clips, Sleigh Couplings, milled Coupling Bolts, reversible Pole Eyes, Stump Joints, finished King Bolts, Body Loops, Spring Clips, canopy-top Standards, Pole Eyes, Fifth Wheels, Steps, Scroll Ends, &c. A cut is given showing a Coupling Clip, bent cold, and it is stated that every size can be bent cold in the same manner.

PAULS BROTHERS, 88 Chambers street, New York: Patent Scale Pocket Knives. The catalogue contains 22 pages of illustrations, showing the various designs of Pocket Knives which they are manufacturing. Scales and bolsters are compressed in one solid mass and riveted to the handle by rivets, holding blades, lining and handle together, resulting in rivetless scales, smooth and neat in appearance.

SPECIALTY MFG. COMPANY, Titusville, Pa.: Star Lawn Swing. The Swing is of wood, designed for lawn use, with the top so arranged that an awning can easily be adjusted. In setting the Swing up the legs are raised into position, the braces drop into grooves, and the bolts are tightened.

UDELL WORKS, North Indianapolis, Ind.: Fancy Cabinet Ware, Wooden Ware, Specialties, Ladders, &c. The catalogue for the fall of 1893 and spring of 1894, devoted to these goods, illustrates Combination Toilet Case, Commodities, Folding Book Case and Secretary, Folding Book Cases and Stands, Shaving Stands, Music Cabinets, Hall Racks, Blacking Cases, Foot Stools, Medicine Cabinets, Hat Rocks, Folding Tables, Folding Steps, Clothes Bars, Towel Racks, Step Ladders, Broom Racks, &c. An illustration is also given of their new works, just completed, covering a space 630 feet long, 72 feet wide and 3 stories high. A large line of new machinery has been added, increasing facilities for production.

COVERT'S SADDLERY WORKS, Farmer, N. Y.: Specialties in Saddlery, Coach and general Hardware, miniature catalogue. In this their seventeenth catalogue the above goods are illustrated with list prices, and especial reference is made to the completeness of their line of Trimmed Neck Yokes and Neck Yoke Centers.

THE WILMOT & HOBBS MFG. COMPANY, 20 Murray street, New York: Cold-rolled "Swedoh" Steel, copperized; also nickel-plated anti-rust Oilers, Lamps and Oiler Sets, &c. Attention is called to the fact that smooth surface cold-rolled No. 20 gauge "Swedoh" is still used in the manufacture of all their Oilers, and that they are heavily copper-plated inside to prevent rusting and the oil becoming gritty. The outside of the goods, it is stated, perfectly resembles burnished copper. All nozzles, from 3 to 18 inches, are interchangeable and will fit any size Oiler. These goods are packed in telescope boxes. The catalogue illustrates Oilers in a variety of forms; also the Economy Can, Odorless Stew and Fry Pan, unmounted Gongs, &c.

LALANCE & GROSJEAN MFG. COMPANY, 19 Cliff street, New York: Supplement No. 2, September, 1893. The supplement is devoted to Agate Iron Ware, White and Blue Enameled Ware, Retinned Ware, Pieced Tin Ware, Tinnings' Stamped Trimmings and Japanned Pieced Ware.

It Is Reported—

That Soren Jensen, Leader, Wis., is building an addition to his Hardware store, which he will lease for other business purposes.

That burglars broke into the Hardware store of C. E. Bondy, Eyota, Minn., Sunday night, August 27, and that they secured a considerable quantity of Cutlery, Revolvers, &c.

That a disastrous fire broke out in the Hardware store of Sampson Bros.,

Duncombe, Iowa, on the morning of August 22, by which the town was practically wiped out, and that the loss sustained by the above firm amounted to \$2500.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices

There has been some improvement in the distribution of the leading lines of Paints and Colors, but conservative policy is still the rule and it is extremely difficult to find evidence of other than the turn in affairs that should naturally come about with the advance of the autumn season. Speculation, or anything akin to it, is conspicuous by its absence, however, and the general situation offers no inducement for venture in the speculative direction. Hence prices continue low all along the line, and it is only in the instance of goods not under "combine" control that well-posted buyers are unable to secure necessary supplies at very low rates. The depression in Linseed Oil is offset in a certain degree by the higher cost of Pig Lead as bearing upon the cost of White Lead in Oil and various prepared Paints, but the endurance of the strength of the market for Pig Lead is problematical and the situation is therefore shrouded in doubt.

White Lead.—Except that purchases have been somewhat more numerous there is no new feature to note. All accounts go to show that jobbers are very cautious buyers and hesitant in view of the peculiar condition of the markets for Pig Lead and Linseed Oil. Smaller buyers are also very careful in their operations for the same reason. Thus far, however, no changes in list prices have been made by the National Lead Company and outside corrodors and manufacturers of mixed Leads do not appear to have cut prices below those that have ruled during the past month or six weeks.

Red Lead and Litharge.—The cheaper varieties of Litharge used by glass and rubber manufacturers have been in very fair request and some contracts for the same were reported closed at 5½¢. High-grade Litharge is held at old rates and finds slow sale. There has been less business in foreign Red Lead, but prices have undergone no further change. Domestic stock has met with slow sale at old prices.

Orange Mineral.—Of foreign brands quite good sales have been made at prices that have ruled for about a month past, and the demand at present is fair. Domestic product continues slow, but the business passing suffices to hold prices quite steady. In any event concessions from the regular list do not appear to be wider than heretofore.

Zincs.—The outturn of stock by local sales agents of American Oxide has been somewhat larger, and, upon the whole, the market shows better form. Grinders are drawing rather more freely upon their contracts; collections are better and less complaint is heard around the trade about the financial situation. Prices are steady. Foreign Zincs are in better request, but the demand is satisfied readily at old prices.

Colors, &c.—There is absolutely no new feature in the market for Dry or Oil Colors. Business is merely fair, the demand drags listlessly and fluctuations in prices are on a very narrow scale. Practically the same may be

said of the general line of mixed Paints.

Miscellaneous.—Arrivals of Block Chalk have been larger, but the greater portion went for delivery on prior contracts. Prices are held very steady in the absence of accumulation of stock here or freer offering of lots for shipment from Europe. There is no change in the market whatever for Whiting, Barytes or other Clays.

Oils and Turpentine.

A further drop in price of Linseed Oil and additional weakness in the market for Cotton-Seed Oils stand out as the prominent features of the market during the week under review. Apart from this and a stronger tone to Menhaden Oil and products thereof, due to reported light catch of fish, there is nothing to report. Speculation is practically dead, distributors and consumers are buying in a very conservative way and the offering is of very much the same general character that it has been since midsummer.

Linseed Oil.—Sharp competition and aggressive action by interests closely identified with the National Lead Company have caused a break in prices to 40¢ for Raw and 43¢ for Boiled Oil manufactured from domestic seed. The relation of supply and demand hardly warrants such a cut in prices, since sales are not stimulated thereby, and a reasonable inference is that a contest for the survival of the fittest is being pushed by interests that are in best position to stand losses for a given time. Thus far the unusually low prices do not appear to have attracted more than ordinary orders.

Cotton-Seed Oils.—The demand has been very slow and offerings for early delivery have increased sufficiently to give the market rather weak tone, as well as to suggest that financial conditions act as a drawback in more directions than one. On wholesale quantities the top prices at present are about 31¢ @ 32¢ for prime crude, 38¢ @ 39¢ for prime Summer Yellow, with other grades upon about the same level. The Union Oil Company of Providence have reduced their Winter Oils 5¢ all around, as follows: Pure Salad and Olive Flavored, from 1 to 10 barrels, 52¢ @ gallon; 10 barrels and over, 50¢ @ gallon; Winter White Oil, from 1 to 10 barrels, 52¢ @ gallon; 10 barrels and over, 50¢ @ gallon; Winter Yellow Oil, from 1 to 10 barrels, 51¢ @ gallon; 10 barrels and over, 49¢ @ gallon. Terms, net cash.

Lard Oil.—There has been little or nothing more than ordinary jobbing demand and the market is rather soft at this writing, although prices are not positively lower. It is easy to buy present-make prime-quality Oil at 65¢ @ 66¢ in jobbing quantities and relatively as cheap by the single barrel, since city and Western pressers are now well up with their orders. Inferior quality is relatively quite as low.

Fish Oils.—There have been larger purchases of crude Menhaden Oil by home trade, and along with continued advices of poor catch of Fish, the movement serves to keep the market quite firm. Crude Sperm and Whale Oils have been neglected. Otherwise there is nothing new to note in the situation and prices for pressed and bleached products remain very much the same as they have been for some time past.

Spirits Turpentine.—Receivers have secured better prices, say 27½¢ for regular and 28¢ for machine barrels. The advance is due chiefly to reduction in supplies sent forward from Southern points, but improvement in the demand is noted, and upon the whole the position of the market is better than it has been for some little time past.

The Wayne Combination Washer.

The washer illustrated in the accompanying cut is made by the Anthony Wayne Mfg. Company, Fort Wayne, Ind. The machine is referred to as being simple in construction and as having no parts which will get out of order. It is stated that the gear is strong, that the sud box is made of well-selected yellow poplar, well bolted together, and that the bottom consists of a heavy sheet of galvanized iron put on with a packing that makes it absolutely water proof. The standards are of hard wood, all painted and varnished. The machine combines the reciprocal pin-wheel motion with an oscillating movement of the whole box. The main ad-

can be attached on the opposite end without fear of tilting the machine. machine is given as 40 pounds, the point being made that it can be easily

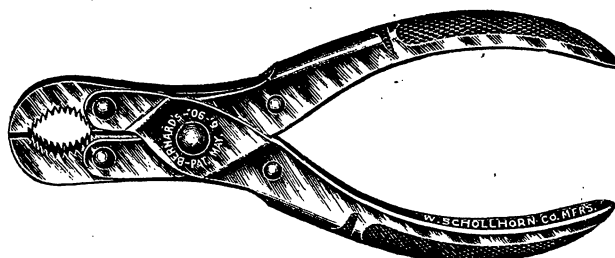


Fig. 1.—Bernard's Gas Pliers.

The hinges are described as being of a unique design of malleable iron, made

handled, besides saving a large amount in freight charges.

Bernard's Gas and Pipe Pliers.

The accompanying cuts represent pliers put on the market by the Wm. Schollhorn Company, New Haven, Conn.; Julius Berbecker & Co., 65 Duane street, New York, agents. The pliers shown in Fig. 1 are made in 4½ and 5 inch sizes, for use on burners and small pipe, while the larger cut, Fig. 2, shows the 7-inch size for small and large pipe. All sizes are made of crucible steel, polished and nickel plated. The manufacturers claim that the parallel movement of the jaws with the short fulcrum of the handles on the jaws gives them the advantage of having double the gripping power of the ordinary gas pliers. They state, therefore, that the smaller sizes, which can be carried in the pocket as conveniently as a knife, are as powerful as the ordinary gas plier of double the weight and size. In the large size pliers the parallel jaws open wide enough, and have circular grooves, so that small pipe or rods may be gripped and held lengthwise, as well as in the ordinary manner.

Acme Well Bucket and Bottom.

Jacks-Evans Mfg. Company, 100-102 South Commercial street, St. Louis,

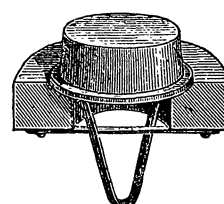


Fig. 1.—Acme Well-Bucket Bottom.

Mo., are introducing bored well-bucket bottoms, in connection with buckets, as illustrated herewith. The bottom con-

vantage, it is claimed, is that the machine works easily, because the water, when the machine is oscillated, is made a factor to help do the work; for as the machine is tilted either to one side or the other, the weight of the water does a large amount of the work. It is explained that the machine has a large capacity, and on account of its oscillating movement it requires a small amount of water, and that it will wash quickly, a continued motion of five minutes doing a large amount of work, as the washer has the double motion of the pinwheel and of the rush of the water through the clothes. When the machine is open and the lid thrown back, as in the cut, the transverse rod to which the rack bar is attached drops into an opening in the side, thereby locking the machine, so that a wringer

especially for this machine, and as entirely out of the way, being intended

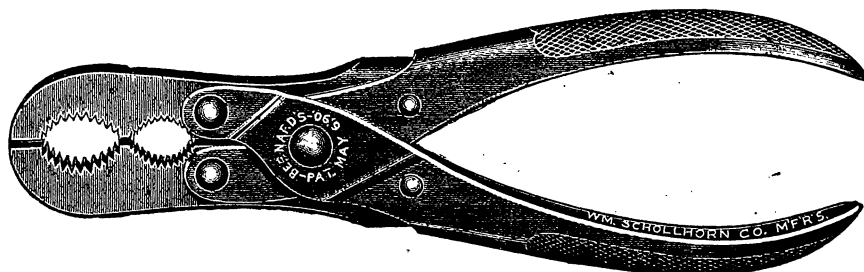


Fig. 2.—Bernard's Pipe Pliers.

both as hinges and also to strengthen the locking device. The weight of the

sists, as shown in Fig. 1, of wood, in the center of which is a circular hole.

The valve is of wood, under which is a piece of leather to which is attached a galvanized iron loop. The valve is prevented from rising more than 1½ inches from the bottom by a straight galvanized piece, fastened to the bottom and passing between the legs of the loop. To renew the leather only two

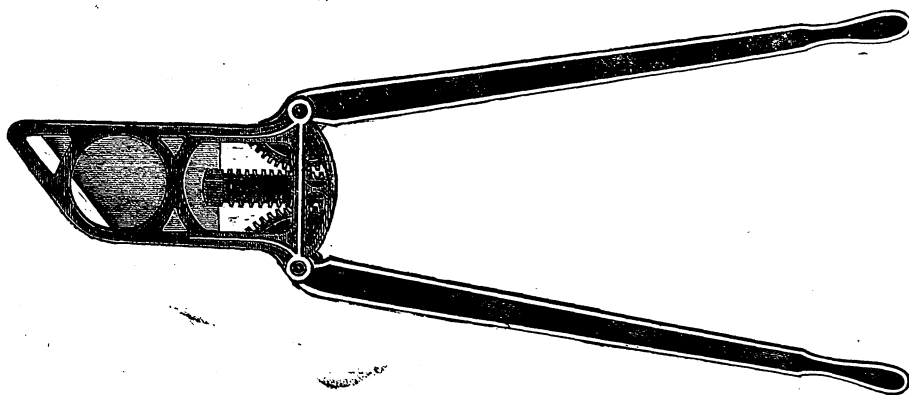


Fig. 2.—Acme Bored Well Bucket.

screws have to be removed, making the operation an easy one. The bucket, Fig. 2, is made of one piece of galvanized iron, resulting, it is stated, in a strong and serviceable bucket. These are made in 3½, 4, 4½, 5, 5½ and 6 inch sizes, each size gauged to hold a pail of water.

Cattle Dehorner.

The accompanying cut represents Newton & McGee's dehorner, manufactured by H. H. Brown Mfg. Company, Decatur, Ill. The dehorner has long handles, with no rivets in the frame, and a blade made on the improved plan. The frames are made, it is stated, of malleable iron, and the blade of the best steel. The blade is operated with a sliding or draw cut, and extra blades may be obtained attached to the cog, or separate from it, as desired. The dehorner is made in three sizes: No. 1, for calves only; No.



Cattle Dehorner.

2, for medium aged cattle, and No. 3, for either young or old cattle.

THE SPRING WORKS of D. W. Shuler & Son, Amsterdam, N. Y., started up August 28 to fill a few orders. After these orders are filled the works will again close down, and no more orders will be accepted until a general resumption of business occurs throughout the country. The works have been closed about a month.

The Economic Steam Cooker.

Illustrations are herewith given in Figs. 1 and 2 of the new Economic



Fig. 1.—Exterior View of Steam Cooker.

steam cooker, manufactured by Rau Mfg. Company, 128 Michigan street,

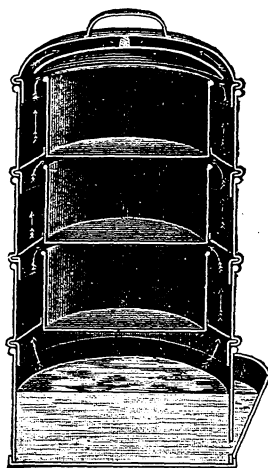


Fig. 2.—Sectional View, Showing Compartments and Interior.

Chicago. The cuts show both the exterior and interior of this utensil. It will be observed that the three com-

partments for cooking are so arranged as to be entirely surrounded by the hot steam arising from the bottom vessel containing the boiling water. The outer compartment protects all the inner vessels from coming in contact in any degree with cold air. The manufacturers state that this is a very important improvement in their form of cooker, as it utilizes all the steam produced and thus cooks quickly, requir-

ing not only less time, but economizing fuel and delivering the cooked food in better shape. No odor escapes from one compartment into another. It is made in two sizes, and either in tin or full nickel.

Buffalo Universal Handy Bench Clamp.

The E. E. Josef Mfg. Company, Washington street, corner of Perry, Buffalo, N. Y., are introducing the



Fig. 1.—Buffalo Universal Handy Bench Clamp.

above clamp, as illustrated in the accompanying cuts. It is suitable in size to go into a tool chest, and is shown in Fig. 1 folded up for this purpose. In Fig. 2 it is represented clamping a block on the top of a bench ready for boring, carving, sawing, &c. In Fig.

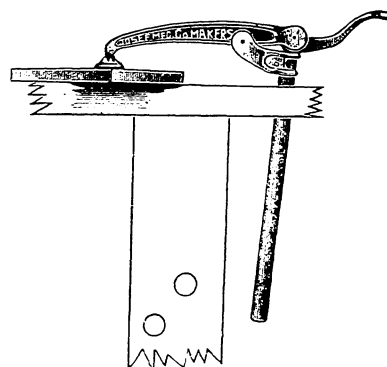


Fig. 2.—Clamping on Top of Bench.

3 it is attached to the leg of the bench, to be used as a bench vise, but with the greater advantage, it is stated, of instant adjustment and capability of firmly clamping anything from a sheet of tissue paper to a block 10 inches in thickness. The clamps are designed

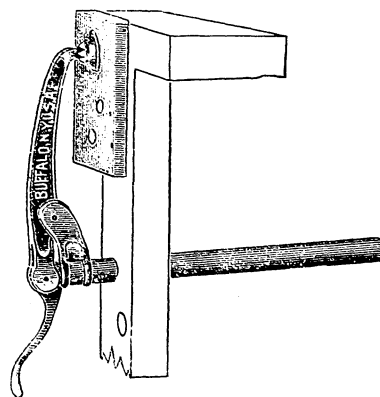


Fig. 3.—Used as a Bench Vise.

for all shop work, for clamping work in any position quickly and securely. They are also recommended for tinkering around the house or farm. They are intended to retail at \$1.

THE T. C. RICHARDS HARDWARE COMPANY and the Franklin More Company, both located at Winsted, Conn., started up on September 4.

Kells' Extension Clamp.

Herbert Kells, Astoria, N. Y., is introducing the above article, as herewith shown. It consists of two side pieces, on one end of which is a block for holding the work, widened at the lower edge; while on the other end is a stationary head block. The bars are of rolled steel, with malleable iron ends. The inner or sliding section of the clamp has a block at one end for hold-

a handle by which the screw may be turned. In operation, when the two sections have been drawn apart a sufficient distance to take in the work to be clamped, as in the cut, the latch is lifted and the head is slid forward in the direction of the stationary head until the latch will engage with the tooth nearest the stationary head. The screw is then turned until the ball has entered the socket in the stationary head, and the screw is further turned until sufficient tension has been exerted

prongs to adapt themselves to the inner surface of the bottle neck. One prong is slightly longer than the other. In operation the longer prong is inserted between the cork and the bottle, and the other prong turned to the opposite side of the cork. By rocking the extractor from side to side the prongs are forced down to the bottom of the cork. The extractor is then turned to the left and the cork drawn. The manufacturers claim that with the extractor three corks may be drawn in the time required to draw one with an ordinary corkscrew.

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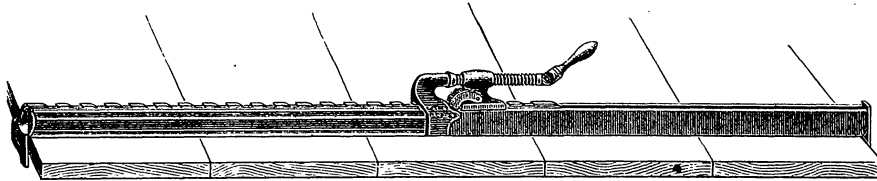


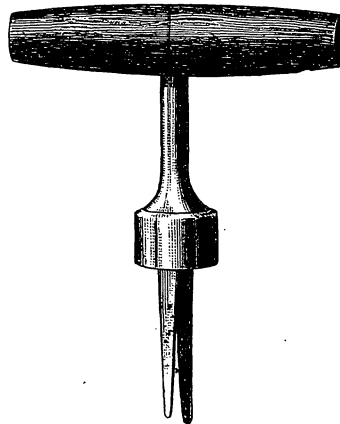
Fig. 1.—Kells' Extension Clamp.

ing the work, and on the top of this section are recesses, producing a series of teeth. An end view of the clamp is shown in Fig. 2, which represents the parts their full size, the sliding bar being $2\frac{1}{4}$ inches high and the outside pieces $1\frac{1}{2}$ inches high. It will be seen that ribs running the entire length of the outside pieces are formed near the center of their inner faces, and corresponding grooves are formed upon the

to tightly clamp the work. The point is made that but little material projects beyond the extremities of the several sections, and that a bit in a brace may be used for making a hole close to the clamp; also that it is not necessary to use an extra bar or strip having a straight edge, as, no matter how far the sections may be drawn apart, the face of the clamp against the work is always perfectly straight. The clamp, as regularly made, when closed is about 34 inches in length, so as to be carried in a tool chest, and may be extended to a little over 5 feet, and weighs 11½ pounds. To secure various lengths of clamps, extensions will be made to the toothed pieces, as shown in Fig. 3. These will be made in two sizes: One to open 7½ feet and the other to open 10 feet. The clamp is designed for use by carpenters, cabinet and piano makers, and for work of all kinds where a clamp is necessary.

Magic Cork Extractor.

Magic Introduction Company, 321 Broadway, New York, are putting the



Magic Cork Extractor.

above on the market, as illustrated herewith. The body of the extractor is iron, the prongs are steel, with hard-

sliding section in order that the under surface of the inner section may be carried down perfectly flush with the under surface of the side pieces; and both the under surface of the side pieces and the sliding section are made as true as possible, so that they will form a perfect guide when the clamp is in use. The under surface of the sliding head block is sufficiently wide to travel upon the upper edges of the side pieces, and is undercut so as to retain its position upon the side pieces; a slot is made lengthwise of the block, on the under side, so it may pass over the teeth on the sliding section, the teeth serving as a guide for the sliding block in its travel from end to end of the clamp. A steel latch is pivoted to the sliding block, so as to enter the recesses between the

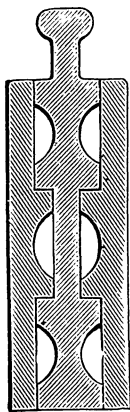


Fig. 2.—Sectional View of the Clamp.



Fig. 3.—Toothed Piece with Extension.

teeth. Above the latch, in the sliding head, is a screw, having a ball at one end, which fits a socket in the stationary head block, and on the opposite end

wood handle; metal parts are all nickel plated. The ends of the prongs inside the body are held in position by a spiral spring, the spring also allowing the

Current Hardware Prices.

SEPTEMBER 6, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range, of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic \$ doz \$3.00, 33½¢
Excelsior \$ doz \$10.00, 50&10&5
North's list net @ 10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Eagle Anvil, 8" x 9"..... 15&15&5¢
Peter Wright's..... 11&11½¢
Armstrong's Mouse Hole..... 10&10½¢
Am. Wrought, Horse shoe brand, 11" x 11½"..... 10&10½¢
Trenton..... 10&10½¢
Wilkinson's..... 10&10½¢
Moore & Barnes Mfg. Co..... 83½¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20%
Cheney Anvil and Vise..... 25%
Allen Anvil and Vise \$3.00..... 40&10%
Star..... 45&5¢

Apple Parers—See Parers. Apple, &c.

Augers and Bits—

Common Augers and Bits..... 70&70&10%
Boring Machine Augers..... 70&70&10%
"Ar Bits, 12-in. twist..... 60%
Russell Jennings' Augers and Bits..... 25&25%
Jennings' Pattern Car Bits..... 40%
Jennings' Pattern Auger Bits..... 60%
Snell's Bits..... 60&5¢
C. E. Jennings & Co., No. 10, extension lip..... 40%
C. E. Jennings & Co., No. 30..... 60%
C. E. Jennings & Co., Auger Bits, 32½" quarters, No. 5, 55¢; No. 30, \$3.50, 25%
Lewis' Patent Single twist..... 45%
Pugh's Black..... 20%
Pugh's Jennings Pattern..... 30%
L'Hommiedieu Car Bits..... 15&10%
Forstner Pat. Auger Bits..... 15%
Cincinnati Bell-Hangers' Bits..... 30&10%

Bit Stock Drills—

Morse Twist Drills..... 50&10&5¢
Standard..... 50&10&5¢
"Leveand..... 50&10&5¢
Syracuse, for metal..... 50&10%
Syracuse, for wood (wood list)..... 30&10%
Cincinnati, for wood..... 30&10%
Cincinnati, for metal..... 45&10%

Expansive Bits—

Clark's small, \$18; large, \$20..... 35&35&10%
Ives' No. 4, \$ doz \$30..... 40%
Swan's..... 40%
Steer's, No. 1, \$20; No. 2, \$18..... 35&40%
Stearns' No. 3, \$48..... 20%

Gimlet Bits—

Common..... \$ gross \$2.75 to \$3.25
Diamond..... \$ doz \$1.25, 40&10%
Bee..... 25&25&5¢
Double Cut, Shephardson's..... 45&45&10%
Double Cut, Ct. Valley Mfg. Co..... 30&10%
Double Cut, Hartwell's..... \$ gro. \$10.00, 40&10%
Double Cut, Douglass..... 40&10%
Double Cut, Ives..... 60&50&10%

Hollow Augers—

Ives' French, Swift & Co. (Beecher)..... 33½&33½¢
Douglass..... \$1.00
Bonney's Adjustable, \$ doz \$48..... 50%
Stearns'..... 20&10%
Ives' Expansive, each \$4.50..... 50&5¢
Universal Expansive, each \$4.50..... 30%
Wood's..... 25&25&10%
Cincinnati Adjustable..... 25&25&10%
Cincinnati Standard..... 25&10%

Ship Augers and Bits—

L'Hommiedieu's..... 15&10% to 15&10&5¢
Watrous'..... 25&25&10%
Snell's..... 25&25&10%
Snell's Ship Auger Pattn Car Bits..... 15&10% to 15&10&5¢

Awl Hafts—See Hafts, Awl.

Awls

Awls, Sewing, Common..... \$ gr. 85¢ to 90¢
Awls, Should. Peg..... \$ gr. \$1.50 to \$1.55
Awls, Pat. Peg..... \$ gr. 35¢ to 38¢
Awls, Shouldered Brad..... \$ gr. \$1.30 to \$1.40
Awls, Handled Brad..... \$ gr. \$2.00 to \$2.10
Awls, Handled Scratch..... \$ gr. \$4.00 to \$4.20
Awls, Socket Scratch..... \$ doz. \$1.10 to \$1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

	Plain.	Beveled.
First quality, best brands	\$7.00	\$7.50
First qual., other brands	6.50	7.00
Second quality	6.50	6.00

Axle Grease—See Greases, Axle.

Axles—

No. 1..... 34¢ to 44¢, No. 2, 5¢ to 6¢
Nos. 7 to 14..... 60&10%
Nos. 15 to 23..... 47½¢
Nos. 19 to 27..... 70%
Concord Axles, load collar..... 44¢ to 6¢
Concord Axles, solid collar..... 54¢ to 6¢
National Tubular, Self Oiling..... 33½¢ to 33½&5¢

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... No. 2000..... 30¢
Chatillon, \$ doz..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40%
Chatillon Circular Balances..... 50&10%

Barb Wire—See Wire, Barb.

Bars—

Crow—
Cast Steel..... \$ doz 3½¢
Iron, Steel Points..... \$ doz 3½¢

Basins, Wash—

Standard Fiberglass, No. 1, 10½-in., \$1.80;
12-inch, \$2.00; 13½-inch, \$2.50; 15-inch, \$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82, 50&10%
Chatillon's No. 1..... 50&10&5¢
Chatillon's No. 2..... 50%
Custer's..... 33½¢

Beaters—

Egg—
Dover..... \$ doz \$1.00 to \$1.20
Duplex (Standard Co.)..... \$ doz \$1.00
Dover (Standard Co.)..... \$ doz \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ doz \$1.50
Bryant's..... \$ gross \$14.00
Double (H. & R. Mfg. Co.)..... \$ gro. No. 0 \$12.00; No. 1, \$15.00; No. 2, \$36.00
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00
Triple (H. & R. Mfg. Co.)..... \$ gro \$16.50
Spiral..... \$ gro \$4.25 to \$4.50
Improved Acme (H. & R. Mfg. Co.)..... \$ gro. \$9.00
Silver & Co..... \$ doz \$5.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2..... 20%

Bells—

Cow—
Common Wrought..... 60&10%
Western, Sargent's list..... 70&10%
Kentucky, "Star"..... 20&10%
Kentucky, Sargent's list..... 70&10%
Kentucky Durham..... 70&10%
Dodge, Genuine Kentucky..... 70&10%
Texas Star..... 50&10% to 50&10&5¢

Door—

Gong, Abbe's..... 33½&10%
Gong, Yankee..... 45&10%
Gong, Barton's..... 40&10% to 50%
Crane, Brooks'..... 50&10&5¢
Crane, Cone's..... 20&10%
Lever, Sargent's..... 60&10%
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10%
Lever, R. & E. Mfg. Co.'s..... 50&10&5¢
Pull, Brooks'..... 50&10&5¢

Electric—

Wollensak's..... 20%
Bigelow & Dowse..... 20%

Hand—

Light Brass..... 70&10% to 70&10&5¢
Extra Heavy..... 70%
White..... 70%
Silver Chime..... 33½&10%
Globe Cone's Patent..... 25&10% to 35%

Miscellaneous—

Call..... 45&50%
Farm Bells..... \$ doz \$2.50
Steel Alloy Church and School Bells..... 40%

Bellows—

Blacksmiths'..... 60&10&5¢ to 60&10&10%
Molders'..... 40&10% to 50%
Hand Bellows..... 40&10% to 50%

Belt, Rubber—

Common Standard..... 75&75&10%
Standard..... 70&5¢ to 70&10%
Extra..... 60&10% to 60&10&10%
N.Y.B.&P. Co., Carbon..... 60&60&5¢
N.Y.B.&P. Co., Diamond..... 50&50&5¢
N.Y.B.&P. Co., Para..... 40&40&5¢

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters..... 15%
Detroit Perfect Tire Bender..... 15%
Green River Tire Benders and Upsetters..... 20%

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron, 6½" x 6½" x 10"..... 60%
Moore's Novelty, Mal. Iron..... 50%
Sure Grip Steel Tackle Blocks..... 25%
See also Machines, Hoisting.

Bolts—

Carriage, Machine, &c.—
Com. list June 10, '84..... 75&10&5¢ to 80%
Genuine Eagle, Norway, list Oct. '84..... 80&5¢ to 80&10%
Eagle, Norway, list Oct. '84..... 80&5¢ to 80&10%
Phila. pattern, list Oct. 7, '84..... 80%
R.B.&W., old list..... 70%
Machine, list Jan. 1, 1890..... 80&10%
Bolt Ends, list Jan. 1, 1890..... 80&10%

Door and Shutter—

Cast Iron Barrel, Square, &c..... 70&10%
Cast Iron Shutter Bolts..... 70&10%
Cast Iron Chain (Sargent's list)..... 65&10%
Ives' Patent Door Bolts..... 60&10% to 60&10&5¢
Wrought Barrel..... 70&10% to 75%
Wrought Square..... 70&10% to 75%
Wrt Shutter, all iron, Stanley's..... 60&10% to 60&10&10%
Wrt Shutter, Brass Knob..... 50&50&5¢
Wrt Shutter, Sargent's list..... 60&10%
Wrt Sunk Flush, Sargent's list..... 60&10%
Wrt Sunk Flush, Stanley's list..... 50&10&5¢
Wrt B. K. Flush, Common..... 55&10%

Stove and Plow—

Stove..... 60&10% to 60&10&5¢
Plow..... 60&10% to 60&10&10%
R. B. & W., Plow..... 55%

Tire—

Common, list Feb. 28, '83..... 65&65&5¢
Port Chester Bolt and Nut Company:
Empire list Feb. 28, '83..... 65%
Keystone, Philadel., list Oct. '84..... 80%
Norway, Phila., list Oct. '84..... 75%
American Screw Company:
Norway, Phila., list Oct. 16, '84..... 75%
Eagle, Phila., list Oct. 16, '84..... 80%
Philadel., list Oct. 16, '84..... 80%
Bay State, list Feb. 28, '83..... 85%
R. B. & W., Philadel., list Oct. 16, '84..... 80%

Borers, Tap—

Common and Ring..... 20&10%
Ives' Tap Borers..... 33½&5¢
Enterprise Mfg. Co..... 20%
Clark's..... 33½&5¢

Borax—

Per lb..... 9½¢ to 10½¢

Boring Machines—See Ma-

chine, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per lb..... 2½¢

Boxes, Miter.

Spiker's Excelsior, 3 in. \$7.50, 4 in \$8.50, 5 in \$13.00, 6 in \$15.00..... 20%

Braces—

American Bit Brace and Tool Co.
Nos. 10, 12, 20..... 60&10%
Nos. 11, 21, 24, 27..... 70&10%
Nos. 22, 23, 25..... 60&10&5¢
Nos. 13, 26, 36, 37..... 70&10&5¢
Amidon's
Barker's Imp'd Plain..... 75&10&80%
Barker's Imp. Nickeled..... 65&10&70%
Ratchet..... 75&10&80%
Eclipse Ratchet..... 60%
Globe Jawed..... 40&40&10%
Corner Brace..... 40&40&10%
Universal, 8 in., \$2.10; 10 in. \$2.25
Batalo Ball..... \$1.10 to \$1.15
Barber's..... 50&10%
Saxton's
Barker's Imp. Polished..... 75&10&80%
Barker's Imp. Nickeled..... 65&10&70%
Ratchet, Polished..... 50&10&60%
Ratchet, Nickeled..... 40&10&50%
Batalo Ball..... net, \$1.10 to \$1.15
Bartholomew's
Nos. 25, 27 and 30..... 60&10% to 60&10&5¢
Nos. 117, 118, 119..... 70&70&5¢
Common Ball, American..... \$1.00 to \$1.10
Fray's Genuine Spofford's..... 60&5¢ to 50&10%
Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 50&10%
Ives' New Haven Novelty..... 70&70&5¢
New Haven Ratchet..... 60&5¢ to 60&10%
Barber Ratchet..... 60&5¢ to 60&10%
Barber's..... 60&5¢
Spofford..... 60&5¢ to 60&10%
P. S. & W. Co., Peck's Patent..... 60%
Rose & Johnson..... 50%
Davis Patent..... 50&10%

Brackets—

Shelf, plain..... 65¢ to 70%
Sargent's list..... 60&10% to 70&10%
Shelf, fancy..... 70&70&10%
Other makers a wide range of prices
Bradley Shelf Brackets..... 70&10%

Bright Wire Goods—See Wire.

Broilers—

Basting..... 9 10 9x11
Basting..... Per doz. \$4.50 5.50 6.50
New Haven..... 50%
Wire Goods Co..... 65&10%
Morgan Odorless..... \$ doz. \$12.50
Queen City..... 33½¢

Buckets, Well—

Galvanized—
Hitt's..... \$ doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad..... \$ doz. 14 qt. \$4.25 to \$4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Brass—

Wrought Brass..... 80&80&10%
Cast Brass, Tiebout's..... 60%

Cast Brass, Fast..... 33½&10%

Cast Brass, Loose Joint..... 33½&10%

Cast Iron—

Fast Joint, Narrow..... 50&10&5¢ to 60%

Fast Joint, Broad..... 50&10&60%

Loose Joint..... 50&10&60%

Loose Joint, Japanned..... 75&75

Loose Joint, Jap. with Acorns..... &10%

Parliament Butts.....

Mayer's Hinges.....

Loose Pin, Acorns.....

Loose Pin, Acorns, Japanned.....

Loose Pin, Acorns, Japanned.....

Plated Tips.....

Wrought Steel.....

Fast Joint, Narrow.....

Fast Joint, Broad.....

Loose Joint, Broad.....

Table Butts, Back Flaps, &c.....

Inside Blind, Regular.....

Inside Blind, Light.....

Loose Pin.....

Bronzed Wrought Butts..... 50&50&10

Callipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt..... 5½¢ to 6¢

Burke's One Prong, Blunt..... 5½¢ to 6¢

Burke's Two Prong, Blunt..... 7½¢ to 8¢

Burke's One Prong, Sharp..... 6½¢ to 7¢

Can Openers—See Openers.

Can.....

Cans, Milk—

S. S. & Co.: 5-gal., \$3.00; 8-gal., \$4.40;

10-gal., \$4.75 each..... 40&10%

Cans, Oil—

Galvanized Blue Band, 5 gal., Tip-Top..... \$ doz. \$12.00

Galvanized Blue Band, 5 gal., Faucet..... \$ doz. \$8.00

Galvanized Blue Band, 1 gal., \$ doz. \$2.25

Glass Oil, Friend..... \$ doz. \$2.75

Caps—

Percussion—

Hicks & Goldmark's and Union Metallic

Cartridge Co. \$1000

F. L. Waterproof, 1-10's..... 35¢ to 37¢

E. B. Trimmied Edge, 1-10's..... 47¢ to 50¢

E. B. Grnd. Edge, Cent. Fire, 1-10's..... 47¢ to 50¢

Musket, Waterproof, 1-10's..... 50¢ to 53¢

G. D..... 27¢ to 30¢

S. B. Genuine Imported..... 4¢

Eley's E. B..... 50¢ to 58¢

Eley's D. Waterproof, Central Fire \$1.60

Primers—

Berdan Primers, \$1.00..... 2%

B. L. Caps

Halters—

Cover's Rope, Jute.....	60&10&10&25
Cover's Rope, 1/4 in. Hemp.....	70&25
Cover's Rope, 1/2 in. Hemp.....	80&25
Cover's Ad. Rope Halters.....	40&25
Cover's Hemp Horse and Cattle Tie.....	50&10&25
Cover's Jute Horse Tie.....	70&25
Cover's Jute Cattle Tie.....	70&10&25
Cover's Ad. Web Halters.....	35&25
Cover's Saddlery Works Halters.....	33&25
Cover's Saddlery Works Horse and Cattle Ties.....	38&25
Cover's Saddlery Works Handy Web Halters.....	33&25

Hammers—**Handled Hammers—**

Maydole's, list Dec. 1, '88.....	25&10&35
Buffalo Hammer Co.....	
Humason & Beckley.....	
Atha Tool Co.....	50&10
Verree.....	
C. Hammond & Son.....	40&10&—
Fayette R. Plumb.....	
Artisan's Choice, A. E. Nail.....	40&10
Regular V. & P. E. Nail.....	50
Horseshoe Turning Hammers.....	50
Other Hammers.....	50&10
Cheney's Claw.....	40&10
Cheney's Machinist's & Riveting.....	50&5
Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75.....	30&10
Nelson Tool Works, new list.....	25&10
Warner & Nobles, new list.....	25&10
Peck, Stow & Wilcox.....	35&40
Sargent's.....	40&40&10

Heavy Hammers and Sledges—

3 lb and under.....	75&10&75&10
3 to 5 lb.....	85
Over 5 lb.....	85
Wilkinson's Smiths.....	10&11&11

Handcuffs and Leg Irons—See *Police Goods*.**Handles—****Cross-Cut Saw Handles—**

Atkins' new list.....	40
Champion.....	15
Ely's Perfection.....	30
Sensible.....	40

Iron, Wrought or Cast—

Door or Thumb.....	
Nos.....	0 1 2 3 4
Per doz.....	\$0.90 1.00 1.08 1.35 1.50
Roggin's Latches.....	60&10&10
Bronze Iron Drop Latches.....	70&25
Barnd Store Door Handles.....	\$1.02
Plate, \$1.10, 1 plate, \$0.88.....	10&10
Barn Door.....	10&10
Chest and Lifting.....	70&70&10

Wood—

Saw and Plane.....	40&10&50
Hammer, Hatchet, Axe, &c.....	40&40&5
Brad A.W.I.....	gr \$2.00
Hickory Firmer Chisel, ass'd.....	gr 4.50
Hickory Firmer Chisel, large.....	gr 5.00
Apple Firmer Chisel, ass'd.....	gr 5.00
Apple Firmer Chisel, large.....	gr 5.00
Socket Firmer Chisel, ass'd.....	gr 3.00
Socket Framing Chisel, ass'd.....	gr 5.00
J. B. Smith & Co.'s Pat. File.....	50
File, assorted.....	gr 2.75
Auger, assorted.....	gr 5.00
Auger, large.....	gr 7.00
Pat. Auger, New.....	30&10
Pat. Auger, Douglas.....	set \$1.25
Pat. Auger, Swan's.....	set \$1.00
Hoe, Rake, Shovel, &c.....	60&60&5

Hangers—

Barn Door, old patterns.....	70&70&5
Barn Door, new patterns.....	70&70
Samson Steel Anti-Friction.....	55
Orleans Steel.....	55
Hamilton Wrought Steel Track.....	55
Champion.....	60&10
Climax Anti-Friction.....	55
Zentich for Wood Track.....	55
Sterling.....	60&10&60
Victor, No. 1, \$15.00; No. 2, \$16.50.....	
Kidder's.....	50&25
Boss.....	60&10&60&10&5
Best Anti-Friction.....	60&10&60&10&5
Duplex (Wood Track).....	60&10&5
Terry's Modern.....	60&10&5
Terry's Ideal.....	60&10&5
Terry's Solid.....	60&10&60
Terry's Shield.....	60&10&60
Terry's Wrought Single Strap.....	60&10
Cronk's Patent, Steel Covered.....	60&10
Carrier Steel Anti-Friction.....	60&10
Richards.....	60&10&5
Lane's New Standard.....	50&5&5
Lane's Standard.....	50&5&5
Lane's Parlor.....	40
Warner's Pat.....	20&10&10
Stearns' Anti-Friction.....	20&10&10
Stearns' Challenge.....	25&10&10
Cincinnati Nos. 1, \$2.25; 2, \$2.50; 4, \$2.50.....	
Paragon Nos. 5, 5 1/2, 7 and 8.....	20&10
Crecent.....	60&60&10
Nickel, Steel, Nos. 0, 25; 1, \$2.00; 2, \$1.50.....	
Chicago Anti-Friction.....	30&10
Star.....	40&10&40&10&5
Barry.....	50
Interstate.....	60&10&60
Pendulum, Payson's.....	40&40&10
Moody.....	45
Economy, \$6.00.....	50&10
Perfection.....	50&10&50&10&5
Lundy, Steel Parlor.....	50&10
Matchless.....	50&10
Magie.....	45&10
Wild West.....	45&10
Moore's Elevator.....	33&25
Moore's Baggage Car Door.....	33&25
Moore's Railroad.....	55

Harness Snaps—See Snaps.**Hatchets—**

American Axe and Tool Co.....	
Blood's.....	
Hunt's.....	40 & 10
Hurd's.....	
Mann's.....	40 @ 10
Peck's.....	40 @ 10
Underhill's.....	85
Fayette R. Plumb.....	
C. Hammond & Son.....	
Kelly's.....	
Buffalo Hammer Co.....	
Sargent's & Co.....	
P. S. & W. Co.....	50 @ 50
Schutte, Lohr & Co.....	810
Ten Eyck Edge Tool Co.....	
Collins.....	105

Hay and Straw Knives—See *Knives*.**Hinges—****Blind Hinges—**

Parker.....	75&25
Huffer.....	50
Clark's Nos. 2, 5, 40 and 60.....	80&25
Clark's Mortise Gravity.....	50
Sargent's Nos. 1, 3, 5, 11, 12, 13, 75&10&10	
Reading's Gravity.....	75&10&75&10&5
Shepard's.....	
Noiseless.....	75&10
Niagara.....	80
Buffalo.....	80
Clark's genuine Pattern.....	80
O. S., Lull & Porter.....	75&10
Acme, Lull & Porter.....	75
Queen City Reversible.....	70&10&50&75
Clark's, Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3.....	75&10&25
North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick.....	\$11.50

Gate Hinges—

Western.....	doz \$4.20, 60&60&10
N. E.....	doz \$7.80, 60&60&10
N. E. Reversible.....	\$5.60, 60&60&10
Clark's Nos. 1, 2, 3.....	60&10&5
N. Y. State.....	doz \$4.90, 60&60&10
Automatic.....	doz \$12.50, 50
Shepard's.....	60&10&5

Spring Hinges—

Geer's Spring and Blank Butts.....	40
Union Spring Hinge Co.'s list.....	
March, 1888.....	20
Barker's Double Acting.....	25
Union Mfg. Co.....	25
Bommer's.....	30
Buckman's.....	15&20
Chicago.....	30
Bardley's Patent Cheeking.....	15
Acme.....	30
U. S.....	25&10
Empire and Crown.....	20
Hero and Monarch.....	55
American, Gem and Star.....	20
Oxford.....	20
Reliable.....	60
Champion.....	60
No. 10 Matchless.....	60
No. 25 Unbreakable.....	60
J. G. C. Covered, gr. 30.....	50&5
Samson.....	60&60&75
Wiles, No. 1, gr. 10; No. 2, gr. 12.....	60
Devore, No. 1.....	gr \$13.00
Rex.....	gr \$13.00
Freeport.....	gr \$12.00
New Idea Nos. 1 and 10.....	gr \$13.00
New Idea Dbl. Acting.....	45
Ideal No. 3.....	gr \$10.00
Stearns' Noiseless Floor Hinge.....	set \$5.00
No. 10 Noiseless.....	20&10&30

Wrought Iron Hinges—

List February 14, 1891.....	50&10&50&10&10
Strap and T.....	50&10&50&10&5
Corrugated Strap and T.....	50&10&5
Screw Hook and Eye.....	14 to 20 in. B. 34
Strap.....	22 to 36 in. B. 34
Screw Hook and Eye.....	14 in. B. 74
16 in. B. 74	
18 in. B. 74	
20 in. B. 74	
22 in. B. 74	
24 in. B. 74	
26 in. B. 74	
28 in. B. 74	
30 in. B. 74	
32 in. B. 74	
34 in. B. 74	
36 in. B. 74	
38 in. B. 74	
40 in. B. 74	
42 in. B. 74	
44 in. B. 74	
46 in. B. 74	
48 in. B. 74	
50 in. B. 74	
52 in. B. 74	
54 in. B. 74	
56 in. B. 74	
58 in. B. 74	
60 in. B. 74	
62 in. B. 74	
64 in. B. 74	
66 in. B. 74	
68 in. B. 74	
70 in. B. 74	
72 in. B. 74	
74 in. B. 74	
76 in. B. 74	
78 in. B. 74	
80 in. B. 74	
82 in. B. 74	
84 in. B. 74	
86 in. B. 74	
88 in. B. 74	
90 in. B. 74	
92 in. B. 74	
94 in. B. 74	
96 in. B. 74	
98 in. B. 74	
100 in. B. 74	

Hoes—**Eye—**

D. & H. Scovill.....	20
Lane's Crescent Planters' Pattern.....	45&5
Lane's Razor Blade, Scovill Pattern.....	30
Mannard, S. & O. Pat.....	45&5
Sandusky Tool Co., S. & O. Pat.....	60&5
Am. Axe and Tool Co., S. & O. Pat.....	60&10
Chattanooga Tool Co., S. & O. Pat.....	50&60&10
Grub.....	60&10
Garden, Mortar, &c.....	70&70&5&25
Planter's Cotton, &c.....	70&70&25
Warren Hoe.....	60&60&5
Magie.....	doz \$4.00

Hog Rings and Ringers—See *Rings and Ringers*.**Hoisting Apparatus—**See *Machines, Hoisting*.**Hollow-Ware—**See *Ware, Hollow*.**Holders—****Bag—**

Sprengle's Pat.....	doz \$18.....60
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Bit—

Extension.....	
Barber's.....	doz \$15.00.....40&40&10
Ives.....	doz \$20.00.....60&5&60&10
Diagonal.....	doz \$24.00.....40
Angular.....	doz \$24.00.....40&5

File and Tool—

Bals Pat.....	doz \$4.00.....25
Nicholson File Holders.....	20

Sash—

Motley's Adj. Sash, Medium Size.....	doz \$1.20.....40
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Hooks—**Cast Iron—**

Bird Cage, Sargent's list.....	
Bird Cage, Reading.....	60&10&10
Clothes Line, Sargent's list.....	
Clothes Line, Moore's.....	70

Clothes Line, Reading list

60&10&60&10&10	
Ceiling, Sargent's list.....	55&10&10
Harness, Reading list.....	55&10&55&10&10
Coat and Hat, Sargent's list.....	55&10&60&10

Coat and Hat, Reading.....**Coat and Hat, Moore's.....****Wrought Iron—**

Cotton.....	doz \$1.25
Cotton Pat. (N. Y. Mallet and Handle).....	30
Wks.....	30
Tassel and Picture, T. & S. Mfg. Co.....	50
Wrought Staples Hooks, &c.....	See Wrought Goods

Wire—

Wire Coat and Hat, Gem, list April.....	60&60&10
1888.....	60&60&10
Wire Coat and Hat, Miles, list April.....	1888
Indestructible Coat and Hat.....	45&45&5
Wire Coat and Hat, Standard.....	60&60&10
Handy Hat and Coat.....	60&10&60
Steady Ceiling Hooks.....	60&10&60
Bush.....	80&15&30&20
Atlas, Coat and Hat.....	55
Williamson's Bird Cage Hooks, list April, 1892.....	40
Bright Wire Goods—See Wire.....	

Miscellaneous—

Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25.....	doz \$2.25
Nolin's Grass.....	55
Whitmore Patent.....	55
Hooks and Eyes—Malleable Iron.....	70&70&10
Hooks and Eyes—Brass.....	60&10&10
Fish Hooks, American.....	50
Bench Hooks—See Bench Stops.....	

Horse Nails—See Nails, Horse**Horse Shoes—**See *Shoes, Horse*.**Hose, Rubber—**

Competition, Fair quality.....	75&75&10
Competition, Low Grade.....	80&80&10
Standard.....	70&10&70&10&5
Extra.....	60&10&60&10&10
N. Y. B. & P. Co., Para.....	25&5
N. Y. B. & P. Co., Extra.....	40&5&50
N. Y. B. & P. Co., Dunder.....	60&60&5
Cotton Garden, 1/4 in., coupled.....	
Fair Quality, 1/4 in.....	7
Good Quality, 1/4 in.....	8 1/2

Huskers—

Blair's Adjustable.....	gr \$8.00
Blair's Adjustable Clipper.....	gr 7.00
Hubbard's Solid Steel.....	gr 4.50

Indurated Fiber Ware—See *Ware, Indurated Fiber*.**Irons.**

From 4 to 10, at factory.....	\$100 B.
Self-Heating.....	doz \$8.00
Self-Heating Tailors'.....	doz \$18.00
Mrs. Potts' Sad Irons, per set:	
No. 50.....	65
No. 55.....	95
No. 60.....	1.05
Crown.....	60&10&60&10&5
Ideal Irons, new list.....	50&10&50&10&10
Salamander Irons.....	25
B. B. Sad Irons.....	30&34
Chinese Laundry (N.E. Butt Co.).....	15
New England.....	5
Malakoff's Trip. Pol. Irons.....	25
Sensible, list Jan. 91.....	50&10&5
Sensible Tailor's Irons.....	33&5
National Self-Heating.....	30

Soldering—

Soldering Coppers.....	19&21
Cover's Adjustable, list Jan. 1, 1886.....	35&25
Tinker's Dread.....	doz \$1.75; gr. \$18

Pinking—

Pinking Irons, doz., 55&60.

Jack Screws—See Screws.**Jacks, Wagon—**

Daley.....	33&4
Victor.....	33&2
Lockport.....	40

Pullers, Nail—

Scranton.....	doz., \$18.00, 89¢
Giant, No. 1.....	doz., \$18.00, 10¢
Giant, No. 2.....	doz., \$18.00, 10¢
Fellows.....	doz., \$9.00, 25¢
Belts.....	doz., \$24.00, 40¢
Economy.....	doz., \$3.00

Pulleys—

Hot House, Awning, &c.....	60¢@70¢
Japanned Screw.....	60¢@10¢
Brass Screw.....	70¢
Japanned Slide.....	60¢@10¢
Moore's Side, Anti Friction.....	50¢
Moore's Ceiling or End, Anti-Friction.....	40¢
Moore's Dumb Waiter, Anti-Friction.....	50¢
Moore's Electric Light.....	35¢
Japanned Cloth Line.....	60¢@10¢
Hay Fork, Solid Eye, 4.00; Swivel.....	1.50
Hay Fork, "Anti-Friction," 5 in. solid.....	1.70
Hay Fork, "F" Common and Patent.....	50¢
Hay Fork, Tarbox Pat. Iron.....	20¢
Hay Fork, Reed's Self-Lubricating.....	60¢
Hay Fork, doore's Anti-Friction 5 in. Wheel, 4.00.....	12.00
Shade Rack.....	45¢
Toolbox Blocks—See Blocks.....	
Shepard's Niagara, No. 25. 2 doz 23¢ net	
Cash (Anger Mortise).....	60¢
Common Sense.....	60¢
Empire.....	60¢
Ideal, Nos. 2, 4, 10 & 15 } 40¢ less 1¢	
Acme.....	doz net.
Star.....	doz net.
On bill, lots extra 5¢.	
Ideal, Nos. 25 and 55.....	doz 22¢ net.

Pumps—

Cistern, Best Makers.....	60¢@80¢@10¢
Pitcher Spout, Best Makers.....	87¢@70¢
Pitcher Spout, Cheaper G'ds.....	75¢@75¢@10¢

Punches—

Saddler's or Drive, good.....	doz., 80¢@85¢
Bemis & Call Co.'s Cast Steel Drive.....	50¢@55¢
Bemis & Call Co.'s Springfield Socket.....	65¢
Spring, good quality.....	doz., \$2.50@3.00
Spring, Leach's Pat.....	15¢
Bemis & Call Co.'s Spring.....	50¢@55¢
Bemis & Call Co.'s Check.....	55¢
Solid Timmers, P., S. & W. Co., doz.....	\$1.44
Timmers' Hollow Punches, P., S. & W. Co.....	20¢@25¢
Rice Hand Punches.....	15¢
Avery's Revolving.....	40¢
Avery's Sawset and Punch—See Sawsets.....	
Niagara Hollow Punches.....	20¢@25¢
Niagara Solid Punches.....	55¢

Rail—

Sliding Door, Wrt Brass.....	doz., 85¢, 40¢
Sliding Door, Bronzed Wrt Iron.....	ft., 7¢
Sliding Door, Iron, Painted.....	ft., 4¢, 40¢
Barn Door, Light.....	5¢
Per 100 feet.....	\$2.00 2.50 3.10, 10¢
B. D. for N. E. Hanger.....	Small. Med. Large.
Per 100 feet.....	\$3.15 2.70 3.25 Net
Terry's Steel Rail.....	ft., 4¢
Victory Track Rail, 7¢ ft.....	50¢@25¢
Carrier, double braced, Steel Rail.....	35¢@45¢
Lundy's Patent and Planed Edge.....	25¢@10¢
Moore's Steel Rail.....	25¢@10¢
Moody Steel Rail.....	ft., 5¢.....45¢

Rakes—

Cast Steel, Association & Co's.....	70¢@70¢@5¢@2¢
Cast Steel, outside & Co's.....	70¢@70¢@5¢@2¢
Malleable.....	70¢@70¢@5¢@2¢
Gibbs' Lawn Rake.....	doz., \$2.75
Gibbs' Canton Lawn Rake.....	doz., \$2.75
Gibbs' Acme Lawn Rake.....	doz., \$4.75
Gibbs' Favorite Lawn Rake.....	doz., \$4.90
Gibbs' Crown Lawn Rake.....	doz., \$6.00
Onela Lawn Rake.....	doz., \$6.00
Fort Madison Prize Bow Brace.....	65¢
Fort Madison Steel Tooth Lawn Rake.....	25¢

Razors—

J. R. Torrey Razor Co.....	20¢
Edenholm and Bucher, \$10 to \$20.....	Net
Jordan's A.A.I. new list.....	Net
Jordan's Old Faithful, new list.....	Net
Salvatico.....	doz., \$15.00
Electric Cutlery Co.....	Net
Campbell Cutlery Co.....	50¢

Razor Straps—

See Straps, Razor.

Registers—

Moore's Japanned.....	75¢
Moore's Electroplated.....	75¢
Moore's Bronze Finishes.....	70¢
Moore's Solid Bronze.....	65¢
Moore's Stove Pipe.....	33¢

Rings and Ringers—**Bull Rings—**

Union Nut Co.....	55¢
Sargent's.....	75¢@10¢
Hotchkiss' low list.....	30¢
Humason, Beckley & Co.....	70¢@10¢
Peck, Stow & W. Co.....	60¢@10¢@50¢@10¢
Murich Edw. Co., White Metal, low list.....	50¢@50¢@10¢

Hog—

Top of the Hill Ringers.....	doz \$2.00
Top of the Hill Rings.....	doz \$1.25
Hill's Improved Ringers.....	doz \$1.25
Hill's Old Style Ringers.....	doz \$1.12¢
Hill's Tongue.....	doz \$3.00
Hill's Rings.....	doz \$1.00
Perfect Rings.....	doz \$2.00
Perfect Ringers.....	doz \$2.15@3.25
Blair's Hog Ringers.....	doz \$2.00
Blair's Hog Rings.....	doz \$0.90@1.00
Champion Ringers.....	doz \$2.00
Champion Rings, Double.....	doz \$3.25
Brown's Ringers.....	doz \$1.50@1.25
Brown's Rings.....	doz \$1.50@1.25
Electric Hog Ringers.....	doz \$2.00
Electric Hog Rings.....	doz \$1.25
Major Ringers.....	doz \$2.00

Rivets and Burrs—

Norway Iron, list Nov. 17, '87.....	60¢@10¢
Second quality.....	70¢
Copper.....	60¢@80¢@10¢
Coppered Iron, Bettina Brand.....	50¢@25¢

Rivet Sets—See Sets.**Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Steel, Brass.....	25¢@30¢
Steel, Black Walnut.....	doz 40¢

Rollers—

Barn Door, Sargent's list.....	60¢@10¢@10¢
Amie Moore's Anti-Friction.....	55¢
Union Barn Door Roller.....	70¢
Moore's Barn Door Stay.....	60¢
Thompson Mfg. Co.'s Lawn Rollers.....	30¢

Rope— The following prices are f.o.b., New York or factory, and are shaded 1/2¢@1/2¢ on large lots; terms, 1 1/2% for cash.	
Manila, 7-16 in. diam. and larger.....	8 1/2¢
Manila, 1/2 in. and 5-16 in.....	8 1/2¢
Manila, Tarred Rope.....	8 1/2¢
Manila, Hay Rope, Medium.....	8 1/2¢
Sisal.....	7 1/2¢
Sisal.....	7 1/2¢
Sisal.....	7 1/2¢
Sisal, Tarred Rope.....	6 1/2¢
Sisal, Medium Lath Yarn.....	6 1/2¢
New Zealand, 7-16 in. & larger.....	6 1/2¢
New Zealand.....	7 1/2¢
New Zealand, 1/2 in. and 5-16 in.....	7 1/2¢
New Zealand, Hay Rope.....	6 1/2¢
New Zealand, Tarred Rope.....	6 1/2¢
Cotton Rope.....	13 1/2¢@16¢
Jute Rope.....	6 1/2¢@7 1/2¢

Wire—

List February, 1892. All kinds.....45¢

Rules—

Boxwood.....	80¢@10¢@80¢@10¢@10¢
Ivory.....	50¢@10¢
Starrett's Steel Rules and Straight Edges.....	25¢@10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers.**Saws—**

Diston's Circular.....	45¢@45¢@5¢
Diston's Cross Cut, list Jan. 1, '93.....	40¢@10¢
Diston's Hand.....	25¢
Woodruff & McFarlin.....	25¢@10¢
Hand Panel and Rip.....	25¢@10¢
Cross One's Saw, 1, 1893.....	45¢@10¢
Wheeler, Madden & Clemson Mfg. Co.....	30¢@10¢
Hand, Panel and Rip.....	30¢@10¢
Cross Cuts, list Jan. 1, 1893.....	45¢@10¢
Atkins' Circular.....	50¢@10¢
Atkins' Cross Cuts, new list.....	40¢
Atkins' Muley, Mill and Drag.....	50¢@10¢
Atkins' Hand Saw.....	40¢
Atkins' Wood Saws.....	40¢
Peace Circular and Mill.....	45¢@45¢@5¢
Peace Hand Panel and Rip.....	25¢@25¢@5¢
Peace Cross Cuts, list Jan. 1, '93.....	45¢@10¢
Richardson's Circular and Mill.....	45¢@45¢@5¢
Richardson's X Cuts, list Jan. 1, '93.....	45¢@45¢@5¢
Richardson's Hand.....	25¢@25¢@5¢
C. E. Jennings & Co.'s.....	25¢

Hack Saws—

Griffin's, complete.....	40¢@10¢@50¢
Griffin's Hack Saw Blades.....	40¢@10¢@50¢
Star Hack Saws and Blades.....	25¢
Eureka and Crescent.....	25¢

Scroll—

Lester, complete, \$10.00.....	25¢
Rogers, complete, \$1.00.....	25¢
Barnes' Builders' and Cab Makers.....	\$15.25
Barnes' Scroll Saw Blades.....	55¢

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality.....	doz \$18.00@19.00
Hatch, Tea, No. 161.....	doz \$6.50@7.00
Union Platform, Plain.....	\$2.10@2.20
Union Platform, Striped.....	\$2.40@2.50
Chatillon's Grocers' Trip Scales.....	50¢
Chatillon's Eureka.....	25¢
Chatillon's Favorite.....	40¢
Chatillon's Turnbulla.....	30¢@30¢@10¢
Riehle Bros' Platform.....	40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting.....45¢**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.).....	\$3.00
Box, 2 Handle.....	doz \$2.25@2.50
Box, 2 Handle.....	doz \$3.00@3.25
Defiance Box and Ship.....	20¢@10¢
Foot.....	50¢@10¢@50¢
Ship, Common.....	doz \$5.50@6.00
Ship, R. I. Tool Co.....	10¢

Screen Window and Door**Frames—See Frames****Screw Drivers—**

See Drivers, Screw

Screws—**Bench and Hand—**

Bench, Iron.....	55¢@10¢@55¢@10¢@10¢
Bench, Wood, Beech.....	doz \$2.25
Bench, Wood, Hickory.....	20¢@10¢
Hand, Wood, Hickory.....	25¢@10¢@25¢@10¢@5¢
Hand, Grand Rapids, list.....	35¢

Coach, Lag and Hand-Rail—

Lag, Blunt Point, list Jan. 1, 1890.....	80¢@80¢@10¢
Coach and Lag, Gimlet Point, list Jan. 1, 1890.....	80¢@80¢@5¢
Hand Rail, Sargent's.....	70¢@10¢
Hand Rail, H. & B. Mfg.....	70¢@10¢@75¢
Hand Rail, Am. Screw.....	75¢

Jack Screws—

Jack Screws, Millers Falls list.....	50¢@50¢@10¢
Jack Screws, P. S. & W.....	35¢
Jack Screws, Sargent.....	70¢
Jack Screws, Stearns.....	40¢@10¢@10¢

Cork—

Humason & Beckley Mfg. Co.....	40¢@10¢@50¢
Williamson's.....	35¢@35¢@25¢
Detroit Cork Screw Co.....	35¢@45¢

Machine—

Flat Head Iron.....	65¢
Round Head Iron.....	60¢

Wood—

List January 1, 1891.....	70¢
Flat Head Iron.....	65¢
Round Head Iron.....	60¢
Round Head Brass.....	65¢
Round Head Bronze.....	70¢
Round Head, Bronze.....	65¢
Rogers' Drive Screws.....	82¢@6¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Grain.....	40¢@5¢@40¢@10¢
Grass.....	40¢@10¢@50¢

Scythe Snaths—

See Snaths, Scythe.

Sets—**Awl and Tool—**

Alken's Sets, Awls and Tools.....	60¢@60¢@5¢
Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9.....	45¢
Millers Falls Adj. Tool Hds.....	25¢
Nos. 1, \$12; 2, \$18.....	25¢
Stanley's Excelsior.....	doz \$6.50
No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.....	30¢@10¢
Common Brad Sets.....	30¢@10¢
No. 42, \$10.50; No. 43, \$12.50.....	70¢@10¢@5¢

Nail—

Square.....	gr. \$1.00@1.25
Round.....	gr. \$3.25
Buck Bros.....	27¢@45¢
Cannon's Diamond Point.....	gr. \$12, 20¢

Rivet—

Regular list.....	70¢
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Saw—

Stillman's Genuine.....	doz \$5.00@7.75, 40¢@5¢
Stillman's Pattern, Hand.....	doz \$3.25
Cross Cut, \$6.50.....	55¢@55¢@10¢
Common Lever.....	doz \$2.00, 45¢@50¢
Hammer, \$1.15.....	40¢@20¢
No. 11, \$16.00.....	40¢@20¢
Nos. 3 and 4, Cross Cut, \$23.00.....	40¢@20¢
No. 5, Mill, \$31.00.....	40¢@20¢
No. 10, \$15.50.....	40¢@20¢
Leach's, No. 0, \$8.00; No. 1, \$15.15.....	20¢@10¢
Nash's.....	20¢@10¢@10¢@10¢
Hammer, \$3.50.....	40¢@20¢
Hammer, Bemis & Call Co's new Pat.....	45¢
Bemis & Call Spring Hammer.....	30¢@5¢
Bemis & Call Co's Plate.....	20¢
Bemis & Call Co's Cross Cut.....	30¢@5¢
Alken's Genuine.....	\$13.00, 55¢@55¢@10¢
Alken's Imitation.....	\$9.00, 55¢@55¢@10¢
Alken's.....	20¢
Diston's Star.....	25¢
Leopold.....	40¢@10¢@50¢
Atkin's Lever.....	doz No. 1, \$6.00
Atkin's Criterion.....	doz No. 1, \$6.00
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00.....	40¢@10¢@50¢
Avery's Saw and Punch.....	50¢
Kohler's Royal.....	doz \$7.00
Kohler's Giant Royal.....	doz \$12.00
Crescent.....	doz \$3.00
Lloyd's Acme.....	doz \$15, 40¢@10¢
Taintor Positive.....	doz \$13, 50¢

Sharpeners, Knife—

Larkins'.....	Applewood Handles.....\$3.00, 40¢
Rosewood or Cocobola.....	doz \$9.00 40¢

Shaves, Spike—

Iron.....	45¢
Wood.....	30¢
Bailey's (Stanley R. & L. Co.).....	40¢@10¢
Stearns'.....	30¢@10¢
Cincinnati.....	25¢@10¢
Goodell's.....	doz \$9.00.....25¢

Shears—

American (Cast) Iron.....	75¢@10¢@75¢@10¢@5¢
Barnard's Lamp Trimmers.....	doz \$3.75
Seymour's, list Dec. 1881.....	60¢@10¢@10¢@10¢@10¢
Heinrich's, list Dec. 1881.....	60¢@10¢@10¢@10¢@10¢
Cast Steel Trimmers.....	35¢@45¢
First quality.....	80¢@80¢@10¢
Second quality.....	80¢@80¢@10¢@10¢
Ame Co.....	1

Whips

American Whip Co.: Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalebone Driving.....	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	38.00
Bureka, Two-thirds Whalebone.....	15.00	16.50	18.00	20.00	22.00	24.00	26.00	30.00
Bull Bone, Half-length Whalebone.....	11.00	12.00	13.00	15.00	16.00	17.00	18.00	20.00
American Standard.....	8.00	8.50	9.50	10.50	12.00	13.50	15.00	16.50
True Grip, Raw Hide Center.....	6.00	6.00	6.50	7.00	7.50	8.00	8.50	9.00
New Name, Stocked Java, Black and Wine Colors.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Americus, 88 Pen Whip.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Gents' Light Driving No. 111.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Gents' Light Driving No. 106.....	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Hand-made Stocked Java No. 108.....	8.75	4.00						
A large variety of cheaper grades.....	60¢	43.00						
Team Whips.....	82.00	57.50						
Toy Whips.....	2.00	2.00						
Hardware Assortment, 10/American, 75 Whips for \$50.00.								

Wire and Wire Goods—**Iron—**

Market,	Br. & Ann., Nos. 0 to 18.	Extra 5¢ to 10¢ often given and net prices often made on large lots.
Br. & Ann., Nos. 0 to 18.	75¢ to 75¢ 10¢ 25¢	
Cop'd, Nos. 0 to 18.	75¢ 25¢	
Galv., Nos. 0 to 18.	70¢ 25¢ 10¢	
Tin'd, Tin'd, Nos. 0 to 18.	70¢ 70¢ 10¢	

Stone, Br. and Ann'd,	Nos. 16 to 18.	80¢	Extra 10¢
Nos. 16 to 18.	80¢ 25¢		
Nos. 27 to 38.	82¢ 25¢		
Tinned Broom Wire, 18 to 21.	44¢		
Galvanized Fence.....	75¢ 10¢		
Brass, List Jan. 18, 1894.....	40¢ 25¢		
Copper, List Jan. 18, 1894.....	40¢ 25¢		
Ann'd Wire on Spools.....	60¢ 25¢		
Malin's Ann'd & Tin'd on Spools.....	60¢ 25¢		
Malin's Brass and Cop. on Spools.....	60¢ 25¢		
Ossawa Mills, Ann'd and Tinned on Spools.....	60¢ 10¢		

Ossawa Mills, Brass and Copper on Spools..... 60¢ 10¢
 Tate's Spooled, Tin'd & Annealed..... 60¢ 25¢
 Tate's Spooled, Cop. and Brass..... 50¢
 Cast Steel Wire..... 50¢
 Stub's Steel Wire..... \$3.00 to 2.30¢
 Steel Music Wire, 12 to 30, imported..... 60¢ 70¢ 25¢

Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard List..... 85¢ 85¢ 10¢

Wire Cloth and Netting—

Painted Screen Cloth 7 100 ft..... \$1.75
 Galvanized Wire Netting..... 75¢ 75¢ 10¢

Wire Barb—

See Trade Report.

Wire Rope—See Rope, Wire.**Wrenches—**

American Adjustable	40¢
Baxter's Adjustable "g".....	40¢ 10¢ 50¢
Baxter's Diagonal.....	60¢
Coe's Genuine.....	50¢ 50¢ 10¢
Coe's "Mechanics".....	50¢ 10¢ 25¢
Girard Standard.....	65¢ 10¢ 70¢
Lamson & Sessions' Engineers'.....	60¢ 10¢
Lamson & Sessions' Standard.....	70¢ 10¢
Orange Winch, American.....	75¢ 10¢ 80¢
Girard Agricultural.....	75¢ 10¢ 80¢
Lamson & Sessions' Agric'l.....	75¢ 10¢ 80¢
W. & B. Diamond.....	75¢ 10¢ 80¢

Bemis & Call's:	
Pat. Combination Bright.....	40¢ 25¢
Pat. Combination Black.....	40 & 18¢
Merrick's Pattern.....	45¢
Brigg's Pattern.....	30¢ 10¢
Cylinder or Gas Pipe.....	45¢ 25¢
No. 8 Pipe.....	55¢
Alken's Pocket (Bright).....	\$6.00, 50¢ 10¢
The Favorite Pocket.....	\$4.00, 40¢
Webster's Pat. Combination.....	50¢
Boardman's.....	50¢ 25¢
Always Ready.....	25¢ 25¢
Alligator.....	50¢
Donohue's Engineer.....	20¢ 10¢
Eagle.....	50¢ 10¢
Acme, Bright.....	50¢ 25¢
Acme, Nickel.....	70¢ 70¢ 25¢
Walker's.....	55¢ 25¢
Diamond Steel.....	55¢ 25¢
Cincinnati Brace Wrenches.....	25¢ 10¢
Taft's Vice Wrench.....	55¢ 10¢ 25¢

Wringers, Clothes—

Am. Wringer Co.'s List, July 1, '93.	2¢ cash
Colby Wringer Co., List Sept. 1, '91.	2¢ cash
Lovell Mfg. Co., List July 1, 1892.	2¢ cash
Peoples Mfg. Co., List Feb., 1892.	2¢ cash
National Wringer & Mfg. Co., List June 1, 1892.	2¢ cash

Wrought Goods—

Staples, Hooks, &c., List March 17, 1893.	85¢ 10¢ 35¢ 1
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Paints, Oils and Colors.—Wholesale Prices.**Animal and Vegetable Oils—**

Linseed, City, raw, per gal.	41¢
Linseed, City, boiled.....	43¢
Linseed, Western, raw.....	40¢
Lard, City, Extra Winter.....	68¢ 68¢
Lard, City, Prime.....	65¢ 67¢
Lard, City, No. 1.....	50¢
Lard, Western, prime.....	65¢ 67¢
Cotton-seed, Crude, prime.....	30¢ 33¢
Cotton-seed, Crude, off grades.....	28¢ 30¢
Cotton-seed, Summer Yellow, prime.....	38¢ 40¢
Cotton-seed, Summer Yellow, off grades.....	37¢ 38¢
Sperm, Crude.....	75¢ 81¢
Sperm, Natural Spring.....	79¢ 81¢
Sperm, Bleached Spring.....	84¢ 86¢
Sperm, Natural Winter.....	85¢ 87¢
Sperm, Bleached Winter.....	90¢ 92¢
Whale, Crude.....	55¢ 56¢
Whale, Natural Winter.....	56¢ 58¢
Whale, Bleached Winter.....	59¢ 60¢
Whale, Extra Bleached.....	59¢ 60¢
Sea Elephant, Bleached.....	55¢
Menhaden, Crude, Sound.....	35¢
Menhaden, Crude, Southern.....	38¢
Menhaden, Light Pressed.....	38¢ 39¢
Menhaden, Bleached Wter.....	43¢ 44¢
Menhaden, Extra Bleached.....	44¢ 46¢
Tallow, City, prime.....	85¢ 87¢
Tallow, Western, prime.....	85¢ 87¢
Cocoonut, Ceylon.....	54¢ 54¢
Cocoonut, Cochinchina.....	64¢ 64¢
Cod, Domestic.....	38¢ 40¢
Cod, Foreign.....	42¢ 45¢
Red Elaine.....	44¢ 46¢
Red Saponified.....	64¢ 64¢
Bank.....	37¢ 38¢
Strait.....	38¢ 40¢
Olive, Italian, bbls.....	58¢ 60¢
Neatsfoot, prime.....	75¢ 80¢
Palm, prime, Lagos.....	74¢ 84¢

Mineral Oils—

Black, 29 gravity, 25 to 30 cold test.....	7¢ 74¢
Black, 29 gravity, 15 cold test.....	74¢ 8
Black, 29 gravity, summer.....	74¢ 8
Cylinder light, filtered.....	14¢ 16¢

Cylinder, dark, filtered.....	10¢ 13¢
Paraffine, 23 1/2 to 24 gravity.....	11¢ 12¢
Paraffine, 25 gravity.....	10¢ 11¢
Paraffine, 28 gravity.....	74¢ 8
Paraffine, red.....	64¢ 104¢

Paints and Colors—

Barytes, Foreign, 10 ton.....	\$22.00
Barytes, Amer. floated.....	\$22.00
Barytes, Amer. No. 1.....	16.00
Barytes, Amer. No. 2.....	13.00
Barytes, Amer. No. 3.....	11.00
Blue, Celestial.....	40¢ 50¢
Blue, Chinese.....	25¢ 40¢
Blue, Prussian.....	8¢ 25¢
Blue, Ultramarine.....	14¢ 25¢
Brown, Spanish.....	3¢ 34¢
Brown, Vandyke, Amer.....	3¢ 34¢
Brown, Vandyke, English.....	3¢ 34¢
Carmine, No. 40, in bulk.....	2.75
Carmine, No. 40, in boxes or barrels.....	2.85
Carmine, No. 40, in ounce bottles.....	3.75
Chalk, in bulk.....	1.75
Chalk, in bbls.....	33¢ 40¢
China Clay, English.....	13.00
Cobalt Oxide, prep'd.....	9.00
Cobalt Oxide, black.....	1.90
Cobalt Oxide, black, lots 100 lb.....	1.90
Green, Paris, in bulk.....	10¢ 104¢
Green, Paris, 170 to 175 lb.....	104¢ 11
Green, Paris, small pack.....	12¢ 17
Green, Chrome, ordinary.....	8¢ 12
Green, Chrome, pure.....	22¢ 25
Lead, Eng. White, dry or in oil.....	84¢ 10
Lead, Eng. White, dry or in oil.....	7¢ 74¢
Kegs, lots less than 500 lb.....	64¢ 64¢
Kegs, lots 500 lb to 5 tons.....	64¢ 64¢
Kegs, lots 5 tons to 12 tons.....	64¢ 64¢
Kegs, lots 12 tons and over.....	64¢ 64¢
Lead, White, in oil, 25 lb tin.....	64¢ 64¢
Lead, White, in oil, 12 1/2 lb tin.....	64¢ 64¢
Lead, White, in oil, 1 to 5 lb sorted tins, add to keg price.....	64¢ 64¢
Lead, Red, bbls, and 1/2 bbls.....	64¢ 64¢
Lead, Red, kegs.....	64¢ 64¢
Litharge, kegs.....	64¢ 64¢
Litharge, bbls, and 1/2 bbls.....	64¢ 64¢

TERMS, &c.—Lead and Litharge.—On lots of 500 lb or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.....	1.35
Ocher, French Washed.....	14¢ 24¢
Ocher, German Washed.....	14¢ 3
Ocher, American.....	14¢ 14¢
Orange Mineral, English.....	84¢ 9
Orange Mineral, French.....	10¢ 104¢
Orange Mineral, German.....	84¢ 9
Orange Mineral, American.....	84¢ 84¢
Paris White, English Cliff-stone.....	1.00
Paris White, American.....	65¢ 75
Red, Indian, English.....	54¢ 7
Red, Indian, American.....	2¢ 64¢
Red, Turkey.....	9¢ 11
Red, Venetian, American.....	9¢ 11
Red, Venetian, English.....	1.00
Sienna, Italian, Burnt and Powdered.....	4¢ 5
Sienna, Ital., Burnt Lumps.....	14¢ 54¢
Sienna, Ital., Raw, Powdered.....	14¢ 34¢
Sienna, Ital., Raw, Lumps.....	14¢ 14¢
Sienna, American, Burnt and Powdered.....	14¢ 14¢
Talc, French.....	14¢ 14¢
Talc, American.....	14¢ 14¢
Terra Alba, French.....	94¢ 125¢
Terra Alba, English.....	70¢ 80
Terra Alba, American No. 1.....	65¢ 75
Terra Alba, American No. 2.....	45¢ 50
Umber, Turkey, Burnt and Powdered.....	34¢ 4
Umber, Turkey, Raw and Powdered.....	34¢ 3
Umber, Turkey, R'w Lumps.....	24¢ 24¢
Umber, Turkey, Bnt. Amer.....	14¢ 14¢
Umber, Turkey, R'w Amer.....	14¢ 14¢
Yellow, Chrome.....	10¢ 25
Vermilion, American Lead.....	114¢ 12
Vermilion, Quicksilver, bulk.....	57¢
Vermilion, Quicksilver, bags.....	58¢
Vermilion, Quicksilver sm'r pkgs.....	62¢
Vermilion, English Import.....	85¢ 90
Vermilion, Imitation, Eng.....	8¢ 35
Vermilion, Trieste.....	90¢ 924¢
Vermilion, Chinese.....	924¢ 95
Whiting Common, 100 lb.....	374¢ 424¢
Whiting Gliders.....	45¢ 55

Zinc, American, dry.....	4¢ 44¢
Zinc, French, Red Seal.....	74¢
Zinc, French, Green Seal.....	9¢
Zinc, French, V. M. X.....	7¢
Zinc, Antwerp, Red Seal.....	74¢
Zinc, Antwerp, Green Seal.....	74¢
Zinc, German, L. Z. O.....	64¢ 74
Zinc, V. M. in Poppy Oil, Seal, lots of 1 ton and over.....	104¢ 114
lots less than one ton.....	11¢ 114
Zinc, V. M. in Poppy Oil, Red Seal.....	10¢ 104
lots of less than 1 ton.....	104¢ 104
Discours.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2; 25 bbls., 2 1/2; 50 bbls., 4 1/2. No discount allowed on less than bbl. lots.	

Colors in Oil—

Black, Drop, Frankfurt.....	25¢ 30
Black, Drop, English.....	12¢ 15
Black, Drop, Domestic.....	7¢ 10
Black, Lampblack, Best.....	20¢ 35
Black, Lampblack, Common.....	7¢ 18
Black, Ivory.....	8¢ 15
Blue, Chinese.....	35¢ 40
Blue, Prussian.....	20¢ 45
Blue, Ultramarine.....	12¢ 18
Brown, Vandyke.....	7¢ 12
Green, Chrome.....	8¢ 13
Green, Paris.....	16¢ 184
Sienna, Raw.....	7¢ 14
Sienna, Burnt.....	7¢ 14
Umber, Raw.....	7¢ 10
Umber, Burnt.....	7¢ 10

Putty—

In barrels and 1/2 bbls.....	.014¢ .014
In tubs.....	.014¢ .014
In tin cans.....	.014¢ .024
In bladders.....	.014¢ .024

Spirits Turpentine—

In regular bbls.....	294¢
In machine bbls.....	30¢

Glue—

Low Grade.....	8¢ 10
Cabinet.....	12¢ 14
Medium White.....	13¢ 15
Extra White.....	17¢ 20
English.....	10¢ 22
Irish.....	12¢ 15

THE IRON AGE.

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